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EDITORIAL.

With the beginning of a new volume I have some announcements to make. In the first place the great increase in the volume of editorial work and correspondence in recent years has made some revision of editorial arrangements essential. Although the experience and ready helpfulness of my colleagues Dr. Ticehurst and Mr. Boyd in an advisory capacity have been (and continue to be) invaluable, it has been inevitable hitherto that the main editorial burden, including the task of seeing the monthly parts of *British Birds* through the press, should fall on myself; and it has been clear for some time that the work entailed had reached a stage at which no single individual of limited leisure, and with professional and other demands on his time which must necessarily have priority, could be expected to cope with it single-handed. To meet this situation I have been fortunate in being able to arrange for the addition of Mr. J. D. Wood, B.A., M.B.O.U., to the *British Birds* staff. Mr. Wood is an assistant master at Leighton Park School, Reading, and an excellent field ornithologist, in whom I have the greatest confidence. He will take over most of the routine editorial work and much of the correspondence, but I shall continue to be responsible for all the essential duties of an editor-in-chief and for dealing with the more critical problems of biology and identification. I am confident that this solution of the problem of division of labour will prove a happy and effective one, and readers with communications to offer to *British Birds* are particularly asked to refer to the revised Notice to Contributors in connexion with the new arrangements.

While writing of editorial matters I may take the opportunity of thanking the numerous contributors to *British Birds* for their almost invariable patience and understanding in the face of the regrettably long delays in publication which are rendered inevitable at present by the combination of paper shortage with the large increase of good material received, as well as of delays in correspondence which have unfortunately been equally unavoidable at times owing to the heavy pressure of work already mentioned. I am glad to state that Messrs. Witherbys have now found it possible to promise the addition of eight extra pages to at least two numbers in the year, a small but welcome increase, but it would be disingenuous to suggest that this will go more than a little way towards easing the situation, and until a substantial increase becomes possible considerable delays in publication are bound to continue. The pressure on our space has weighed especially heavily on reviews and notices. This also the editors much regret and they realize that a delayed review loses something of its value for readers, but they believe that original communications are more important still and deserve some precedence. Every effort is being made to find means of improving the position, but it will be obvious that the difficulties and vexations of the present time are not peculiar to *British Birds*, and we must all hope that the real solution in the form of a general improvement in the industrial and economic situation will not be too long deferred.

Finally, readers may notice that in the present number the use of trinomials in scientific names has been for the most part abandoned. This step, which has been taken after the most careful consideration, may cause surprise to some, but only, I venture to suggest, because the nature of subspecies and the significance of trinomial names have been largely misunderstood by field ornithologists. It is only in a very small proportion of cases that the use of subspecific names in relation to field observations is really scientifically justified or serves a useful purpose. It had been my intention to accompany the introduction of the change in question with a paper dealing with the concept of subspecies from the point of view of the field worker and the complexities and difficulties involved, but for various reasons it has proved impracticable to publish this in the present number and it has been held over until March. This paper will, I believe, make the need for the change fully apparent and I would ask any who feel disposed to disagree to withhold judgment till they have read it.

B. W. TUCKER.

The activities of the five pairs which attempted to breed at this site may be summarized:—

FIRST CLUTCHES.

<i>Pair.</i>	<i>Clutch.</i>	<i>Completed.</i>	<i>No. and date hatched.</i>	<i>No. and date young reached flying-state.</i>
1	4	Before or on May 2nd	Nil	Nil
2	3	Before or on May 2nd	Nil	Nil
3	4	Before or on May 2nd	1—Noon, May 24th	1—July 3rd
4	4	Before or on May 2nd	4—May 24th	Nil
5	4	Before May 5th	Nil	Nil

Pair 1 lost their eggs on the night of May 11th-12th, rats almost certainly being the cause, although proof is wanting. Two eggs disappeared from the nest of pair 2 on the night of May 18th-19th; the final egg went on the following night. All three shells were recovered from under a tuft of grass 30 yards from the nest and had almost certainly been destroyed by rats. Pair 3 lost two eggs on the night of May 18th-19th, and a third egg was lying 6 inches from the nest on the following morning at dawn and was replaced. It seems likely that a rat had been disturbed in the process of rolling this egg away. The egg was cold and may have been removed by the birds, as only one egg was in the nest on the following day. On the morning of May 24th this egg had a small hole, about $\frac{1}{4}$ inch diameter, in the side and the chick was piping from within. The chick emerged about midday. The *minimum* incubation-period for this egg was therefore a full 22 days. This chick was first observed to fly 40 days after hatching. On May 22nd, 1130, two of the four eggs in the nest of pair 4 were observed to be slightly cracked. At 0900 on the 23rd, all four eggs were cracked and one had a small hole pierced in its side and the chick could be heard piping within. At 1300, May 24th, the nest contained one dry chick, one wet chick, one chick half out of the shell, while the fourth egg had a large hole in its side. All four chicks were observed with a telescope actively moving about near the nest later in the afternoon. It is just possible that the first chick emerged from the shell on May 23rd. These four chicks were last seen on May 30th. A dead chick, estimated at eight days old, was picked up in long grass in the vicinity of the spot where the chicks were last seen. The body showed no obvious sign of injury and it is considered possible that this brood may have succumbed in the wet and cold weather at the end of May and early in June.

Pair 5 lost their clutch to rats. One of the pair was sitting at daybreak on May 20th, but on inspection at 0800 the nest was empty, but after a brief search in the vegetation near by, two eggs, uncracked, were recovered and replaced in the nest. The day was warm and sunny and the eggs did not appear to be chilled. The

behaviour of the adults was then watched from a distance with a telescope. They were feeding in the vicinity, but although they frequently walked near the nest (one of them even standing beside it for several minutes) neither bird of the pair showed the slightest inclination to sit. A watch was kept throughout most of the day, but no incubation took place. The two eggs were fully exposed to the sun, which shone throughout from a cloudless sky. The eggs remained uncovered through a chilly night. On the morning of May 21st it was found that the parents had moved off. At 1100, the two observers (P.E.B. and R.W.) being both perfectly satisfied that these eggs had been abandoned, they were taken and were then again fairly warm from being exposed to the sun for several hours. One egg was noticeably smaller than the other and measurements were made, the results being 49.5×34.5 mm. and 49.0×33.0 mm. respectively. Both eggs were then carefully examined. The first contained an almost fully-developed but dead embryo; the second contained a similarly-developed *live* embryo, the legs especially twitching very obviously. When it is remembered that it is known definitely that this egg had not been incubated for at least 27 hours, including exposure in an open nest during a night with a cool northerly wind, the fact that one embryo had not been killed seems remarkable.

SECOND CLUTCHES.

<i>Pair.</i>	<i>Clutch.</i>	<i>Completed.</i>	<i>No. and date hatched.</i>	<i>No. and date young reached flying-state.</i>
1	4	May 18th	Nil	Nil
2	3	May 25th.	3—1, a.m., June 17th and 2 on June 17th or 18th.	2—between July 24th and 28th.

Pair 1 hen laid the first egg of her second clutch only just over 3 days after losing the first. The second nest was over 100 yards from the first one. The eggs of this second clutch disappeared from the nest on the night of May 22nd-23rd, and one sucked egg recovered from under a tuft some yards away again testified to the probable cause being rats.

Pair 2 hen also laid the first egg of her second clutch just over 3 days after the loss of her first. The second nest was within a few yards of the first one. As it was considered highly probable that rats would get this clutch, it was decided to dig a trench round the nest, deep enough to fill with water. While obviously a rat could cross a two-foot strip of water if it wished to do so, it was considered more likely that it would make a detour round the edge and thus miss the eggs. The trench was therefore dug on the afternoon of May 24th, when the nest contained two eggs. Both parent birds had to be disturbed and afterwards neither would return to incubate, although they had been sitting on the eggs in the morning. At dusk the nest was still vacant, but at dawn the birds were sitting and changing-over normally and later it was found that the third and last egg had been laid. All three eggs

survived, the first hatching about 1100 on June 17th, and the other two chicks had emerged by the following day. The incubation-period was therefore just over 23 days if calculated from the completion of the clutch. One of the three chicks was apparently killed in a severe hailstorm on June 22nd, the parent failing to brood it; the body was subsequently recovered. Both the other two chicks reached the free-flying stage during the last week in July.

3. SITE THREE.

This site was not discovered until late in the season, although its existence had been suspected. Some pairs may have nested here early in May, but it seems possible that these were reinforced by some of the pairs which had lost their first clutches at site two. For reasons which need not be discussed in this paper, observers working at this site were badly handicapped and in the early days the issue was confused. It will be sufficient to set down briefly the known facts.

It is not known how many pairs actually nested here, but at least 14 adult birds were occasionally present in the area at the same time. Great difficulty was experienced in trying to assess the numbers of chicks in the area before they reached the free-flying stage, when a considerable proportion would always be in cover at any particular moment. However, by the middle of July six birds of the year had reached the flying-state, while two others were "flapping" and subsequently flew. Clearly these two less-developed chicks probably belonged to one brood, and the other six were probably the progeny of two or three pairs. In addition, at this time, another pair had two chicks about three weeks old and these reached the free-flying state during the first week in August. Thus it is definitely known that ten young Avocets were successfully reared at this site and a minimum of four pairs must have bred.

4. OBSERVATIONS ON BEHAVIOUR.

Pre-nesting phase.—Huxley (1925) has drawn attention to the absence of courtship behaviour in the Avocet. This view has been disputed by Makkink (1936). However, Makkink takes a rather different standpoint from Huxley, the latter emphasizing the lack of any formal display prior to copulation, while Makkink expressly counts under courtship behaviour "copulation, sexual encounters, nesting activities and pairing up". This, however, seems to be too wide a definition to be readily countenanced: once the pairs have been definitely formed, courtship must surely be considered to have ceased.

The behaviour of the birds on arrival at site one was extremely quiet. While it was very evident that the birds consorted in pairs, they spent most of their time feeding and preening and there was no evidence of any hostility.

Copulation, the "scrape" ceremony, and nest-building.—Copulation was first observed at site one two days after the arrival of the birds. It was recorded many times on subsequent occasions until the end of May. With a very few exceptions it always occurred in water. The pair would be quietly feeding, when the hen would strike the "invitatory" posture, lowering her neck in front of her until the bill was laid along the surface of the water and tilting her tail up to a much greater angle than that figured in the paper by Makkink (*ibid.*). On one or two occasions the false-preening by the male, mentioned by Makkink, was observed at this stage, but the general impression conveyed was that the female was invariably, or almost invariably, the initiator of copulation. Once the female had adopted this attitude she would remain perfectly motionless. Usually the male would immediately react, but sometimes one or two minutes would elapse before anything further happened; but never once did the female adopt this attitude without ultimately evoking the appropriate response from the male.

It has been mentioned that rarely the male would start to "false-preen", passing his bill through the wing on the side nearest to the female. More often this was omitted, and the male would walk (or occasionally run) towards the female, approaching her from the rear. Sometimes he would mount almost immediately, but usually he would appear very excited, and would dart round behind her, alternately taking up a position first on one side of her and then on the other. These side to side darts were sometimes protracted for upwards of a minute, but the speed of the male's movements made it difficult to follow in detail everything that was happening. It never appeared, however, that the male ever touched the female. Finally he would jump lightly on to her back and with wings extended vertically over his back, wing-tips almost touching, he would tread the hen.

The behaviour immediately after copulation varied considerably. Usually the male appeared to slither down over the head of the female; sometimes the female appeared to move forward from under the male. Both birds would then run away very rapidly for many yards, usually ten or twelve but occasionally up to 25 or 30, both birds separating from one another on diagonal paths. Both birds would then start preening or feeding. It was never observed that the pair ran forward together after copulation, with bills touching, as noted by Makkink (*ibid.*). A second copulation often followed within a few minutes.

It was unfortunate that at the time the birds were copulating at site one, it was not known that they were probably spending part of their time at one of the other sites. The "scrape" ceremony was therefore only witnessed at site two, in the case of one pair which did not breed there and with two pairs which had "repeat" clutches. This piece of behaviour appears to run concurrently with that of copulation. As it is almost impossible to

be certain of the sexes in the Avocet (although in a good light the females certainly appear to show more brown near the tips of the dark feathers) it is equally impossible to be definite as to which bird of a pair is performing any particular act. On the whole the available evidence suggests that both sexes indulge in the "scrape" ceremony and in many of the actions characteristic of nest-building.

The habit of "seraping" has been well described and figured by Makkink (*ibid.*). The performing bird starts to lower itself to the ground, as if about to sit, but falls forward on its breast, tail stuck up at an acute angle and wings held rather loosely. It then performs a curious scratching movement with the legs, which obviously forces the pivotal point of the breast more firmly against the ground and also (owing to the fact that the leg movements are not synchronized with each other) causes rocking motion from side to side. "Seraping" certainly takes place at several spots before the final nest-site is apparently fixed. Similar behaviour has been described in the Lapwing (*Vanellus vanellus*) by Selous (1905) and Stanford (1927), and in that species it would appear that the "seraping" is begun by the male and only indulged in later by the female to a lesser degree. If this could be confirmed for the Avocet, it would suggest that the main value of the "serape" performance was stimulatory. Certainly it may not have any direct effect on nest-building, many of the nests being constructed on almost level ground where little or no seraping has occurred.

Nests varied considerably in the amount of material used in their construction. This, in turn, seemed to depend on the type of material which was immediately to hand. When dead reeds were used the nests were comparatively bulky: on the other hand when dead *Salicornia* stems were resorted to the amount used was almost trivial. At best the building appeared to be a desultory affair. It seems likely that material was added during the period when the eggs were being laid and even after the completion of the clutch.

Communal displays.—The striking communal displays have been fully described by Makkink (1936). A brief general description must suffice here. Without any apparent cause, from 3 or 4 up to 8 or 9 birds would suddenly foregather, roughly forming a circle with their tails outward, bowing heads to the ground so that the tips of the bills were very close. A good deal of piping was kept up, and other birds would fly in to join the group. After a variable period, but usually within a minute or two of the formation of the bowing group, hostilities would suddenly break out between birds. This appeared to be usually hostility between two birds at a time, rather than a general outbreak, although several couples might be engaged in scrapping with each other at the same moment. Once the fighting had broken out, with

one bird pursuing another, the group soon broke up and all the birds usually dispersed very quietly a minute or two later.

Makkink has criticized Huxley (1925) regarding his statement that "the species is, indeed, a singularly peaceable one." It would appear, however, that Huxley based this somewhat dogmatic and certainly misleading statement on a series of observations covering about a fortnight at the beginning of the breeding-season. This limitation may account for the fact that he certainly could not have witnessed one of these communal gatherings. From observations made in 1948, it would appear that these gatherings seldom occur in the early part of the breeding-cycle. The first records occurred during the first week in May, when all birds at site two were incubating. For the rest of May these groupings were a daily phenomenon and sometimes several took place in one day. Early in June they died down and by the middle of the month only half-hearted versions, involving perhaps three or four birds at the most, were noted.

Behaviour during incubation.—Apart from participating in the communal ceremonies just described (and it is as well to emphasize that most sitting birds would leave their nests to join a displaying group) the behaviour of birds during the incubation-period was on the whole fairly quiet. While it is extremely difficult to distinguish the sexes, it is comparatively easy to ascertain by watching a particular nest for a long period that both birds of the pair take a considerable share in incubation. Experience in 1948 showed very conclusively that after the completion of the clutch, the eggs were only very occasionally left uncovered. This is contrary to observations made by Lynn-Allen at another site in the previous year (Brown and Lynn-Allen, 1948). It must be borne in mind that the weather during the early weeks of incubation was exceptionally dry and warm in both seasons. It is, therefore, singularly difficult to reconcile the observations for the two years.

The following table summarizes the lengths of a number of timed periods of birds sitting on eggs *after* the completion of the clutch. All observations were made between May 6th and 20th, when the weather was generally fine and warm.

TABLE I.—PERIODS ON EGGS, SEXES NOT DIFFERENTIATED.

<i>Period in minutes.</i>	<i>No. of instances.</i>
0- 29	13
30- 59	17
60- 89	13
90-119	4
119-149	5

In addition, three longer periods were recorded of 160, 180 and 250 minutes in duration.

That the laying of the first egg of a clutch releases the desire to incubate, but that this desire builds up over the laying period

is suggested from observation carried out on one pair under very equable weather conditions. It will be convenient to tabulate these results:—

TABLE II.—PERCENTAGE OF TIME EGG OR EGGS INCUBATED.

<i>Date.</i>	<i>No. of eggs in nest.</i>	<i>Period of watch in minutes.</i>	<i>Percentage of incubation.</i>
May 15th	1	60	75
May 16th	2	960	89
May 17th	3	191	97
May 18th	4	240	100

Occasionally a bird would leave the nest to feed near by for a minute or two. Normally a sitting bird waited until relieved by her mate. Usually there was a certain amount of ceremony at the changing-over of duties, but this was a highly variable factor, and would vary from an elaborate change-over to a complete lack of ceremony in two consecutive “reliefs” at the same nest. There was nothing to suggest that the behaviour was in any way dependent upon the sex of the relieving bird. Usually the relieving bird would fly in, pitch within about thirty yards of the nest, and start to walk towards it slowly but deliberately. Normally when this bird was about ten yards from the nest, but sometimes not until it was much closer, the sitting bird would flick the ground with its bill, as if moving material, then rise and stand a little to the side of the nest, bowing very deliberately and flicking with its bill. The approaching bird would also flick and for a few moments the two birds would often stand flank to flank at the nest, both flicking and bowing. The newcomer would then settle on to the eggs and the relieved bird would walk slowly away, usually bowing the bill to the ground with each step and flicking it over the shoulder, as if throwing something towards the sitting bird. When some yards from the nest the departing bird would suddenly fly off to some suitable spot at which to feed.

Behaviour of birds with young.—Nothing was more striking than the extraordinary change in the behaviour of the parent birds on the hatching of the eggs. During the incubation, except when indulging in the noisy group displays, the birds were extremely quiet. It is true that they would leave the nest on comparatively slight provocation, but they would usually only walk a few paces away and begin (mock?) feeding or preening and only occasionally would they utter any call. But as soon as even one egg of the clutch was really chipping, and the chick could be heard piping within, the behaviour of the parents was completely different. On the slightest alarm, whether from the presence of human being, crows or gulls, they would immediately set up a shrill and continuous piping and, leaving the chicks, fly towards the cause of the disturbance, bearing down upon it and only swerving aside at the last moment. If this “dive-bombing” display failed to deter the

intruder, the birds would then settle on the ground near by and run rather awkwardly along with the tail depressed so sharply that it lay in a vertical plane. Although a bird indulging in this display certainly looked uncouth, it would seem to require a fertile imagination to describe it as "injury-feigning". A similar display has, in any case, also been noted between quarrelling birds in a communal gathering. However, sometimes this display does develop into something rather more elaborate, the wings also being brought into play, the impression of awkwardness and inability then being enhanced to such a degree that the term "injury-feigning" must probably be considered admissible. If this display still failed to have any effect upon the cause of the disturbance, the displaying bird would again have recourse to flight and a renewal of the dive-bombing tactics coupled with redoubled cries. If there was any deep water in the vicinity the bird would almost certainly settle upon it. Avocets were several times recorded swimming in deep water on normal occasions, but when disturbed with chicks they nearly always had recourse to deep water if it was available; it is difficult to suggest any reason for this behaviour.

The chicks were active from birth, and were frequently observed swimming about in water within an hour or two of leaving the egg. Glegg (1925) was impressed with the manner in which very young chicks responded to the call of the adults. But this would appear to be a variable factor. Under normal conditions, if the parents piped up in alarm, the chicks did not appear to pay the slightest heed. On the other hand, if a sudden shower came on when the brood was scattered, a few piping calls from the presumed female nearly always brought the chicks running for shelter. It may well be, however, that it is the rain itself which causes the chicks to seek the parent, and the only effective purpose of the piping may be to indicate to the chicks her whereabouts.

Observations were obtained of chicks being brooded up to the eleventh day after hatching. While it was not possible to be sure, it certainly appeared that one bird only of a pair (presumably the female) was responsible for brooding the young.

Only one instance of a chick being pecked by a parent in the extraordinary manner described by Selous (1927) was noted. This occurrence was witnessed by the writer on the evening of June 3rd, when the solitary chick of pair 3 was about 10 days old. One parent twice approached the chick and pecked at it, then picked it up in its bill and dropped it with a flick which strongly suggested to the observer that it would not long survive such treatment. But the chick itself appeared none the worse, and scampered about in a very lively way. Only one bird of the pair behaved to the chick in this way, and on each occasion the other bird moved slowly up and then flew at it with a little run.

Relations with other species.—During incubation the birds were

mainly intolerant of gulls (*Larus* spp.) and Carrion Crows (*Corvus corone*) only. A crow flying over would almost certainly arouse the hostility of the whole colony. Sheld-Duck (*Tadorna tadorna*), Oyster-catchers (*Haematopus ostralegus*), and Lapwings (*Vanellus vanellus*) would only be pursued if they approached very closely to the nest. The writer has already described an encounter between an Avocet and a male Sheld-Duck (Brown 1948). After the hatching of the eggs, however, almost any bird will be pursued: Ringed Plover (*Charadrius hiaticula*) and Redshank (*Tringa totanus*) were especially harried, and very often when a parent was flying off in pursuit of a plover, the chicks would be left exposed to the mercies of gulls flying low above them. It seems important to emphasize, however, that in spite of long periods of close observation, no observer saw any serious attempt made by any species of gull or by Carrion Crows to take either eggs or chicks of the Avocets, though they certainly had the opportunity of doing so on occasion. Duck and some other ground-nesting birds in the vicinity certainly suffered to some extent either from gulls or crows, or from a combination of the two.

Observers.—The foregoing notes have been compiled from the field log-books maintained at the sites, in which the following observers had recorded observations on Avocets:—

C. Boyle; P. E. Brown; P. W. P. Browne; H. P. Burdett; Miss M. G. Davies; G. Dent; R. C. Homes; A. E. Jolley; J. Keiser; J. A. Nelder; R. E. Pochin; Miss A. Pritchard; J. K. Stanford; H. M. Stanford; J. Taylor; J. Wightman; R. Wolfendale.

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REACTIONS OF SOME PASSERINE BIRDS TO A STUFFED CUCKOO.

BY

GEORGE EDWARDS, ERIC HOSKING AND STUART SMITH.

(Plates 1—9).

THIS account describes some experiments carried out during the spring of 1948 to test the reactions of certain of the smaller passerine birds to the presence of a stuffed Cuckoo (*Cuculus canorus*) in their nesting territories. The experiments were of an exploratory nature, and all that is attempted here is an illustrated account of the methods used and the observed reactions. Theoretical considerations must await a wider and more detailed experimentation than we have been able to attain in one season.

Descriptions of the reactions of the various species are given below in the order in which we carried out the experiments, and this order has no other significance. All the illustrations are from Hosking's high-speed flash photographs.

WILLOW-WARBLER (*Phylloscopus trochilus*).

One of us (S.S.) has described (*British Birds*, Vol. xxxix, p. 118) how a Willow-Warbler responded to an artificially produced Cuckoo call with a threat-display and an unusual harsh chittering note not previously heard. The use of this note by Willow-Warblers when Cuckoos were near was confirmed by Butlin (*ibid* p. 215), although Brown (*ibid.*, p. 280) also heard this note when an owl was near to a brood of young Willow-Warblers. We were therefore interested to see what effect our stuffed Cuckoo would have on a pair of Willow-Warblers whose newly hatched young were in a nest placed at the base of a small gorse bush.

As we walked towards our already erected hide-tents, carrying the Cuckoo with us, the cock Willow-Warbler recognized the dummy when we were about 20 yards away. He immediately started to call with the note mentioned above. This is a squeaky, rapidly repeated, chittering "chee-chee-chee". As it is uttered, the bird flicks its wings continuously and gapes its mouth widely. It should be noted that when we approached the nest without the Cuckoo, the note was the normal anxiety note "hewie hewie".

The chittering brought the hen bird from the nest and she joined the cock, behaving as he was doing. When one of us approached the bush to fix the dummy over the nest, the two Willow-Warblers were very agitated and came very close, fluttering over the dummy and calling. It was evident that they would readily attack it, so Smith knelt down and held the Cuckoo over the nest. The cock Willow-Warbler immediately attacked it, flying down at its head and pecking especially at the crown, nape and eyes of the dummy (Figs. 1-2). Both cock and hen attacked, but the hen was less vigorous in her attacks and she "ran-down" more quickly than he, and then merely chattered from a fence near by and flicked her wings. The first attack

by the cock lasted for 8 minutes; the second for 3 minutes 20 seconds. Thereafter there was no further attack during this trial. Once the cock alighted on the dummy's head, ran down its body, and pecked at its rump. Several times the cock rushed at its mate and attacked her instead of the Cuckoo. This behaviour was also duplicated by the Nightingale (see below). Once the cock also attacked its own image in the silvered reflectors of the high-speed flash apparatus. The normal "hewie" alarm note was used very occasionally.

The noisy chittering of the Willow-Warblers attracted several other species. An adult Tree-Pipit (*Anthus trivialis*) arrived and flew down as though to attack the Cuckoo, but the Willow-Warbler, which was at that moment attacking the dummy, left it and drove off the pipit. A Great Tit (*Parus major*) and a Yellow Bunting (*Emberiza citrinella*) arrived and perched near the dummy but did not attack, though both postured slightly at it. NIGHTINGALE (*Luscinia megarhyncha*).

Three nests of the Nightingale were located, and the effect of the dummy tried at each. All the nests contained small young less than a week old. In general, behaviour followed a fairly common pattern. At the first nest, the Cuckoo was erected about 2 feet above it. Both cock and hen Nightingales returned together and immediately and most vigorously attacked the Cuckoo. Associated with the attacks was a characteristic note quite unlike the usual harsh churring alarm note. We called this "the starling note" because it very closely resembled the nasal screech of young Starlings. During the attacks the tail was widely spread and the wings usually raised (Fig. 3). Attacks took the form of vigorous pecking at head and nape, and especially at the eyes, and also scratching with claws and beating with wing pinions. Only occasionally was the back part of the dummy attacked. Usually there was a whirring mass of feathers, with cock and hen fluttering continuously over the dummy or hanging from the head by one or both feet, and pecking savagely all the time (Fig. 4). In their anxiety to attack the dummy, the cock and hen Nightingales frequently collided: once when this happened the hen fell to the ground and the cock rushed down at her, pecking at her breast as she lay on her back.

In general, the hen sustained her attacks longer than the cock, and in this the Nightingales differed from the Willow-Warblers.

During a second trial on the following day, the hen Nightingale attacked the Cuckoo before we had time to erect it, and Fig. 5 shows Edwards holding the dummy with the hen bird attacking its crown. Later, after attacks had been continued for some time, we thought it advisable to let the birds feed the young. We therefore covered the dummy with a large handkerchief, but this had little effect, for the hen bird continued to fly at the covered dummy (Fig. 6). We were almost constrained to brush her aside with a sweep of the hand!

When both Nightingales were attacking, the general commotion and their screeching cries attracted several other birds. A pair of Willow-Warblers arrived, together with a cock Blackcap (*Sylvia atricapilla*) and a Garden-Warbler (*Sylvia borin*). All these birds approached the Cuckoo, the Willow-Warblers chattering and flicking their wings, the Blackcap with raised crest and the Garden-Warbler with partially spread wings. None attacked it, however. In addition, two male Cuckoos and a female (which "bubbled") perched in a tree overhead, and watched the attacks.

When the attacks had continued for about 30 minutes, we removed the dummy Cuckoo and, carrying it some 12 feet from the nest, placed it on the ground. Both Nightingales thereupon left the scene of the nest and continued their attacks on the Cuckoo as it lay in the open.

At the second nest, reaction was similar to that recorded for the first, except that the hen bird often thrust her beak into the Cuckoo's nape and held it there for several seconds.

At the third nest, with the dummy fixed 2 feet above it, both the adult birds at once attacked, though the cock bird sustained his attack only for about 30 seconds. The hen on the other hand, continued to attack the dummy for half-an-hour, pecking at head, crown and especially eyes. At intervals, a dancing attack took place in which the hen flew down from one perch, tore at the dummy's head, and rushed up to another perch. She then turned and reversed the procedure. When the dummy Cuckoo was removed, the hen Nightingale returned frequently to the position where it had been, using the "starling" alarm call and alternating these visits with rapid visits to the nest.

YELLOW BUNTING (*Emberiza citrinella*).

The Cuckoo was placed on a post 6 feet in height and 6 feet from a Yellow Bunting's nest containing young. A pair of Willow-Warblers were the first birds to arrive, and they chattered and flicked their wings at the dummy, but did not attack it. A Whitethroat (*Sylvia communis*) and a Blue Tit (*Parus caeruleus*) were attracted by the cries of the Willow-Warblers, but did little beyond flitting around and calling.

When the adult Yellow Buntings arrived both attacked the Cuckoo, fluttering over its head, and pecking and scratching at the crown. Once, when one of the Willow-Warblers came near to the Cuckoo, both Yellow Buntings attacked it. The hen Yellow Bunting carried food for the young in her beak and she retained this during the attacks. Neither bird paid any visits to the nest whilst the Cuckoo was in position.

CHAFFINCH (*Fringilla cœlebs*).

The nest of this bird was in the same garden as contained the Willow-Warbler's and the Yellow Bunting's. The nest had two small young and an egg, and was situated in a briar hedge. We

erected the stuffed Cuckoo 3 to 4 feet from the nest. The hen Chaffinch was on the nest and did not leave it even after the Cuckoo was erected. As soon, however, as we flushed her from the nest, she attacked the dummy, calling all the time with the normal "chink chink" alarm note. The attacks were very vicious, with large pieces of feather torn bodily from the crown and nape (Fig. 7). The cock bird, who now appeared, made only one attack at the beginning, when no hide tent or apparatus was present. As soon as these were erected, he refused to come near the dummy.

After a period of sustained attacks, the hen Chaffinch's reaction to the Cuckoo so far diminished that she finally returned to the nest to brood. We then removed the Cuckoo. When we re-erected it much later, her behaviour was similar to that already recorded, namely, that she remained on the nest until flushed and then immediately attacked the Cuckoo. In only two periods of attacking, the hen Chaffinch completely laid bare the nape and crown of the dummy.

TREE-PIBIT (*Anthus trivialis*).

A pair with a nest containing young near to that of the Chaffinches came to attack the Cuckoo erected over the latter's nest. Attack took the form of fluttering over the dummy and striking at the head with bill and feet (Fig. 8). The note was a continuous repetition of the usual "seep, see-cep" call of the pipits. Reaction to the dummy ran down fairly rapidly and after 10 minutes, no further attacks were made. At a nest of Tree-Pipits containing five hard-set eggs, a dummy Cuckoo was erected on a branch a few inches above the nest. Here we got attacks by the hen bird only, the cock never approaching nearer than 5 or 6 yards and giving no display at all. He merely moped in the undergrowth, calling.

The hen pipit made a series of quick and sudden attacks on the dummy, again on the crown and nape of the head, pulling out numerous feathers, which were blown away in the wind (Fig. 9).

In addition, in one series of attacks, she flew at the Cuckoo from below, clinging to the dummy in an upside-down position and pecking at its face. Reactions died down in 25 minutes and the hen then went to brood the eggs.

WHINCHAT (*Saxicola rubetra*).

We found a Whinchat's nest with six eggs on a marsh. When the stuffed Cuckoo was erected on a stump 3 feet above the nest, both cock and hen attacked it. The note used during attacks was a harsh chittering, not unlike, but lower pitched than, that employed by Willow-Warblers. The normal "u-tiek" alarm note was not used. The birds were very tame when the Cuckoo was in position, approaching within a few feet of observers.

The hen bird rapidly "ran-down" in reaction, and soon returned to her eggs, which were just hatching. The cock, however, con-



Fig. 1. WILLOW-WARBLER ATTACKING STUFFED CUCKOO HELD IN HAND.

Fig. 2. WILLOW-WARBLER ATTACKING CROWN OF STUFFED CUCKOO.

(Photographed by Eric Hosking).



Fig. 3. NIGHTINGALE ATTACKING STUFFED CUCKOO.

Fig. 4. NIGHTINGALES ATTACKING STUFFED CUCKOO.

(Photographed by Eric Hosking).



Fig. 5. NIGHTINGALE ATTACKING STUFFED CUCKOO HELD IN HAND.

Fig. 6. NIGHTINGALE ATTACKING HANDKERCHIEF DRAPED OVER STUFFED CUCKOO.

(Photographed by Eric Hosking).



Fig. 7. HEN CHAFFINCH ATTACKING STUFFED CUCKOO.

Fig. 8. TREE-PIBIT ATTACKING STUFFED CUCKOO.

(Photographed by Eric Hosking).



Fig. 9. HEN TREE-PIPIT ATTACKING STUFFED CUCKOO.
Fig. 10. COCK WHINCHAT DIVING AT HEAD OF STUFFED CUCKOO.
(Photographed by Eric Hosking).



Fig. 11. COCK WHINCHAT ATTACKING STUFFED CUCKOO.

Fig. 12. SEDGE-WARBLER ATTACKING STUFFED CUCKOO.

(Photographed by Eric Hosking).



Fig. 13. HEN WOOD-LARK POSTURING BEFORE STUFFED CUCKOO.

Fig. 14. MALE WOOD-LARK GIVING "LURE" DISPLAY BEFORE STUFFED CUCKOO.

(Photographed by Eric Hosking).



Fig. 15. HEN RED-BACKED SHRIKE ASSUMING AGGRESSIVE ATTITUDE TOWARDS STUFFED CUCKOO.

Fig. 16. COCK RED-BACKED SHRIKE ATTACKING STUFFED CUCKOO; THE HEN POSTURING FROM THE NEST.

(Photographed by Eric Hosking).



Fig. 17. COCK RED-BACKED SHRIKE.

Fig. 18. HEN GARDEN-WARBLER DISPLAYING AT STUFFED CUCKOO.

(Photographed by Eric Hosking).



UPPER.—COMMON TERN PERCHING ON FLOWER-HEAD.
(See p. 27).

(Photographed by J. McGiffert).

LOWER.—NEST OF COMMON GULL WITH FIVE EGGS, SUTHERLAND,
MAY, 1947. (See p. 28).

(Photographed by R. Casement).

tinued his attacks either by diving at the dummy's crown (Fig. 10) or by alighting on the Cuckoo and hammering at its head with his beak (Fig. 11). Pecking was especially directed at the crown and around the eyes of the dummy. A feature of the attacks was the way in which reaction diminished and then returned if the bird was scared away from the dummy. Thus after a minute or two of attack, the cock Whinchat would often stand quietly for quite long periods (e.g., 5 minutes) on the Cuckoo's back doing little beyond now and then gently removing a loose feather from the dummy's crown and eating it. If, however, one of us frightened the Whinchat from the dummy's back, it would at once return with a full-blooded attack. As with the Willow-Warblers, the presence of the Cuckoo seemed to remove all fear of human beings from the Whinchats. As one of us held the dummy in one hand, the cock came and sat on its back and could quite easily have been picked up by the other hand.

SEDGE-WARBLER (*Acrocephalus schœnobænus*).

The nest contained small young. The Cuckoo was erected about 6 inches to the right of the nest. The first bird to return (probably the hen), did not attack the Cuckoo but called with a harsh "churr, churr". The cock then arrived and attacked the dummy. Attacks were mainly rapid flight-attacks using beak and claws (Fig. 12), the warbler not alighting on the Cuckoo but going from one perch to another. At one time, the cock Sedge-Warbler gave a threat-display whilst perched above the dummy, fluffing out its feathers and uttering a curious hissing note. The initial attacks lasted 7 to 8 minutes, and were followed by the threat-display. When the dummy was removed, the hen bird, which had perched near by watching the cock's attacks and scolding all the time, at once returned to the nest and brooded, and was there fed on several occasions by the cock.

WOOD-LARK (*Lullula arborea*).

The nest, containing small young, was on an East Anglian heath. The dummy Cuckoo was placed on the ground just behind the nest. The hen Wood-Lark returned first, with food in her bill, and on seeing the dummy she crouched low on the ground, spread her wings and lifted her tail and then crept forward in a series of crouched runs of a pace or two (Fig. 13). She then withdrew slightly and "false-brooded" in a depression near by.

When the cock returned, he gave a wonderful display of "lure" tactics, scurrying about on the ground with wings spread and sometimes flapped. He often prostrated himself thus before the Cuckoo, with spread wings, elevated mantle, head drawn in, and fanned tail (Fig. 14). Once the cock bird leaned to one side and raising his left wing in the air, waved it feebly once or twice after the manner of Ringed Plover (*Charadrius hiaticula*) in their lure-display. The note used by both Wood-Larks during this time was a plaintive "too-ee, too-ee".

During another trial, when the young Wood-Larks were 6 days old, we placed the Cuckoo with its head over the nest. After a display like that described above, one of the Wood-Larks crouched in the nest, facing the Cuckoo and covering the young with wide-spread wings, whilst the other lark looked for food. We noticed that, whereas under normal conditions both the Wood-Larks would be away together seeking food for the young, when the Cuckoo was there one always remained at the nest. On one occasion, the adult at the nest held a faecal sac for 10 minutes in its bill, waiting for the return of the other bird.

There were actual attacks by both birds on the Cuckoo, when it was placed very near to the nest, but they were not frontal attacks, nor were they pushed home with any vigour. Mostly the larks fluttered round to the back of the Cuckoo and either pecked at its cloaca or tugged at its tail-feathers. Once only did one of the adults rush at the Cuckoo from one side, buffet it near its carpal joint and then hurriedly leap over its back.

RED-BACKED SHRIKE (*Lanius collurio*).

The nest contained young 5 to 6 days old, the Cuckoo being fixed just to the right of the nest. The hen shrike approached the nest through the brambles to the left, and on seeing the Cuckoo adopted a threat-posture with puffed-out feathers and partially spread tail (Fig. 15). Later she made one or two half-hearted attacks, usually veering away from the Cuckoo just before reaching it. Twenty minutes later the cock shrike arrived with food, but dropped this as soon as he saw the dummy and dived on to its back, knocking it clean off the perch.

When we replaced it, both cock and hen attacked it. The hen attacked the dummy's head, then went to the nest, where she brooded the young, though often adopting a threat-posture, leaning forward with open gape and raised feathers. The cock meanwhile attacked continuously, flying on and off the Cuckoo's back, and pecking at its head and sometimes pulling at its tail-feathers (Fig. 16). Between these rapid attacks, the cock would posture on a twig above the dummy, often bringing his tail up over his back and spreading it widely to show the black and white feathers (Fig. 17). Throughout the attacks a harsh churring note was used by both cock and hen.

The dummy was in position for 45 minutes and was then removed. The cock came several times to the spot where the dummy had been before resuming feeding.

GARDEN-WARBLER (*Sylvia borin*).

The dummy was erected at two nests of the Garden-Warbler. At the first, which contained small young, very little reaction took place, the hen bird skulking in the undergrowth uttering a plaintive "whit whit" note. At the second nest, containing three eggs, the hen returned first and made a slight demonstration

against the Cuckoo, by crouching slightly with half-spread wings and opened beak (Fig. 18). She then went to the nest to incubate the eggs, turning occasionally towards the dummy, raising herself up, and gaping with partly spread wings. When the cock returned to the nest, he called with a series of harsh notes; the hen left the nest, and the cock made a single buffetting attack on the dummy. Then both birds fluttered about the nest bush calling and churring.

We experimented with the dummy Cuckoo at a nest of the Blackbird (*Turdus merula*) containing fairly large young, and although we moved the Cuckoo about and varied its position relative to the nest, we could get no reaction whatever. When we substituted a stuffed Jay (*Garrulus glandarius*), however, the Blackbird reacted to it violently and at once.

Similarly, we could get no reaction to the Cuckoo at nests of Wren (*Troglodytes troglodytes*), Redstart (*Phœnicurus phœnicurus*), Hedge-Sparrow (*Prunella modularis*), and Robin (*Erithacus rubecula*).

At the Wren's nest, the Cuckoo was ignored, but a dummy Wren was attacked once, for about 5 minutes, by the hen Wren.

The Hedge-Sparrow's nest contained fairly large young, and here the birds refused to approach the nest while the Cuckoo was in position.

The Robin's nest contained eggs, and the hen Robin went directly into the tin containing the nest, and ignored the Cuckoo.

Without entering deeply into the subject one may pose the question "Do birds recognize the Cuckoo for what it is?" That many small passerines will attack a Cuckoo is well-known from field observations. Baker in his *Cuckoo Problems* (Witherby, 1942) gives several examples of strong and sustained attacks by the Burmese Stonchat (*Saxicola caprata burmanica*) on the Khasia Hills Cuckoo (*Cuculus canorus bakeri*) when the latter were laying eggs in their nests, and other cases could be quoted.

From our experiments we are not yet in a position to be dogmatic about the question. We can, however, deduce that certain birds can differentiate one type of dummy from another. Thus Willow-Warblers will attack a dummy Cuckoo, but will not come near a stuffed Sparrow-Hawk. Nightingales on the other hand attack both hawk and Cuckoo, but fear a stuffed Stoat (*Mustela erminea*). Blackbirds disregard a Cuckoo, but attack a Jay. Tree-Pipits attack a Cuckoo violently, but will come nowhere near a Jay. Whinchats attack both Cuckoo and Sparrow-Hawk.

We hope by future trials to resolve this and other interesting questions which have presented themselves as the result of these initial experiments.

We are indebted to Mr. R. Wagstaffe, Keeper of the Yorkshire Museum, for lending to us stuffed specimens under the British Trust for Ornithology Study-Material Service.

NOTES.

NOTES ON SOME BIRDS IN NOTTINGHAMSHIRE
IN 1947.

THESE notes are of scarce birds in Nottinghamshire in 1947, or give new information on the county status of others. Considerations of space forbid full treatment of all waders, etc., seen on the Nottingham Sewage Farm, only outstanding species or information being listed. Where notes are not initialled, they are the work of many observers, a full list of which is appended.

ROSE-COLOURED STARLING (*Pastor roseus*).—An adult seen at close quarters with Starlings at Wilford, March 16th. (R.O'B., R.M.).

GOLDEN ORIOLE (*Oriolus oriolus*).—Close views of a pair at Oxtun during last week in April. Male bright buttercup yellow, black wings and tail, some yellow on sides of latter at tip. Bill fairly stout, pinkish yellow. (D.B.H.). A pair was constantly seen in a copse on the Notts-Leics border near Loughborough between June 14th and August 7th inclusive. Striking song and notes often heard. Birds may have been present earlier, but no breeding evidence available. (H.H.).

WOODLARK (*Lullula arborea*).—Further work on this species shows that it breeds in suitable spots throughout the whole of the sandstone "spine" of the county from the north to within six miles of the Trent in the south.

ROCK-PIBIT (*Anthus spinoletta petrosus*).—Two seen at Netherfield gravel pond on April 4th. Dark legs and plumage, "smoky" outer tail-feathers noted, calls heard. (R.J.R.).

BLUE-HEADED WAGTAIL (*Motacilla f. flava*).—Single males at different points of Nottingham sewage farm on May 10th and 16th. One July 26th, and two August 18th at Netherfield gravel pond. (R.J.R.). Male at Colwick, May 22nd. (H.B.).

BLACK REDSTART (*Phoenicurus ochrurus gibraltariensis*).—Male singing on a disused building in Nottingham on June 6th. (R.J.R.), and a "redstart" seen on a bombed building near by for some days at this period. (J.W.).

GREY LAG-GOOSE (*Anser anser*).—One seen by Trent at Colwick, February 8th; a flock of 22 large geese "with grey shoulders" seen by lock-keeper there on February 17th were traced to a feeding ground near, where fresh footprints in the snow were larger than those of Pinkfeet seen a few days previously. (R.J.R.). A single bird at Attenborough gravel ponds consorted with Mute Swans for some weeks in November and December, becoming tame enough for heavy head, orange bill, etc., to be well seen at close quarters. (A.T., S.C.D.).

PINK-FOOTED GOOSE (*Anser fabalis brachyrhynchus*).—From the state of the snowy grass, a flock of seven by the Trent at Fiskerton on February 14th had evidently been there for some days. (J.S., R.J.R.).

SHELD-DUCK (*Tadorna tadorna*).—Three pairs known to have reared young in Trent valley east of Nottingham. Following this an absence of the species for some weeks was in turn followed by the presence of flocks of up to 34 in September and October, these being considered the local stock. Smaller numbers throughout year, and usual transitory birds. Summary by J.S.

PINTAIL (*Anas acuta*).—Very numerous records from all waters show that upwards of 50 wintered in the county, this number often being touched on a single water when species absent on others. Conversely, smaller flocks on several waters simultaneously apparently combine into the large single flock as circumstances demand or permit. Summary by J.S.

LONG-TAILED DUCK (*Clangula hyemalis*).—An adult male and two females on Trent near Radcliffe on February 1st, in hard weather. On February 11th two females on Trent at Bleasby, and among a flock of Snow at Stoke Bardolph were three adult males and several females. (R.J.R.). Five birds

distantly seen by J.S. and R.J.R. at Bleasby on February 10th were very probably some of these.

VELVET SCOTER (*Melanitta fusca*).—A pair on Netherfield gravel pond, January 25th. (J.S., A.T., A.D.). Pair on Trent, Bulcote, March 2nd. (J.S.). Single females at Hoveringham and Radcliffe, March 1st and 9th respectively. (R.B.).

BLACK-NECKED GREBE (*Podiceps nigricollis*).—One on a northern water was present from late 1946 right through 1947, the changes in and out of breeding plumage being watched by many observers.

BAR-TAILED GODWIT (*Limosa lapponica*).—Apart from passage birds not here listed, the winter bird reported in *British Birds*, Vol. xl, p. 222, stayed until April 6th, 1947.

GREAT SNIPE (*Capella media*).—On September 13th a large, dark, short-billed snipe was put up on Nottingham sewage farm by J. S. and Dr. E. O. Höhn. Sufficient detail seen—comparative sizes of body and bill, barred underparts and generally dark appearance, together with straight flight, to make it almost certainly a Great Snipe, and in the afternoon Dr. Höhn, in company with J. S. Ash again found the bird in the same place, and had excellent views, the white on the outer tail-feathers being especially noted. J.S.A. has previous experience of the species.

RED-NECKED PHALAROPE (*Phalaropus lobatus*).—On September 20th two were seen together on the Nottingham sewage farm by J.S. and R.J.R. Later in the day R.J.R. saw three together on another part of the farm. On the following day observers separated, and each party found a pair of phalaropes simultaneously on pools about $\frac{1}{2}$ -mile apart, four birds in all. (J.S., R.J.R., A.D., Mr. and Mrs. D.A.T.M.). Very fine black bills and dark legs noted. Mantles brownish-sepia with warmer brown or buffish edgings, one bird of each pair being richer in general colour as well as being slightly superior in size and retaining some reddish on the front of the neck.

LITTLE STINT (*Calidris minuta*).—In view of scarcity of spring records here, four on sewage farm May 12th, and one on 16th, all in summer plumage, are of interest. (J.S.). Usual small numbers in autumn.

TEMMINCK'S STINT (*Calidris temminckii*).—Up to four on Nottingham sewage farm, August 10th to 20th. (J.S., R.J.R.). Three on September 20th, two on 21st. (J.S., R.J.R., D.A.T.M.).

RUFF (*Philomachus pugnax*).—At least 50 on Nottingham sewage farm during arctic spell in February and March. Passage in good numbers as usual.

GREY PLOVER (*Squatarola squatarola*).—One at Netherfield gravel pond, January 11th, (R.J.R.), and one on sewage farm on 19th, and one August 10th. (J.S.).

OYSTER-CATCHER (*Hæmatopus ostralegus*).—One at Nottingham sewage farm, September 20th. (R.J.R.).

COMMON TERN (*Sterna hirundo*).—Several pairs bred successfully at four or five sites, some of them new, in the Trent Valley.

LITTLE GULL (*Larus minutus*).—A wing and picked carcase in rat-hole at Netherfield gravel pond, January 18th, a first-year bird on sewage farm, August 13th, and a dead adult under wires there on 20th. (R.J.R.).

BLACK-HEADED GULL (*Larus ridibundus*).—About 100 pairs bred for the first time at Hoveringham gravel ponds, many young being reared on the islets there. (J.S.).

QUAIL (*Coturnix coturnix*).—A pair with brood of small young at Osberton, August 11th. (J.F.). A nest of 10 eggs was mown out, and two separate broods of small young seen a few miles from Oxton in August. (A.L., J.W.R.). Besides these young birds, at least six pairs of adults were present through the summer in the Bunter sandstone country between the above two places. (J.S.).

The records are from the notes of J. S. Ash, H. Barlow, R. Brook, S. C. Davis, A. Dobbs, Judith Foljambe, D. B. Harrison, N. Harwood, E. O. Höhn, H. Hunt, A. Longman, R. Mann, J. N. McMeeking, D. A. T. Morgan, R. O'Brien, R. J. Raines, J. W. Richardson, J. Staton, A. Teather and J. Walker, to all of whom I am indebted.

J. STATON.

"SMOKE-BATHING" OF ROOK.

THE correspondence about this habit in various birds includes a rather vague reference (*antea*, Vol. xl, p.340) to its occurrence in the Rook (*Corvus frugilegus*), and I can add an observation to confirm this. On August 10th, 1948, a Rook at Catterick Camp, N. Yorks, spent at least fifteen seconds "smoke-bathing" in thin smoke on the leeward side of a chimney, and not only ruffled its feathers, but also performed many contortions which were evidently designed to secure more complete distribution of the smoke over its body.

J. M. McMEEKING.

SISKINS BREEDING IN WESTMORLAND.

MR. M. G. Robinson has already recorded (*antea*, Vol. xxxix, p. 150) that Siskins (*Carduelis spinus*) were present in the Ullswater district of Westmorland during the summer of 1944 and again in late April, 1945. During the summer of 1945 I also saw a pair of Siskins in an area close to the one where, I understand, Mr. Robinson made his observations; but I was not able to spend much time studying the birds that year.

In 1946 more intensive watching was possible and resulted in proof of breeding in this part of Westmorland. Small parties of Siskins were noted from March 1st onwards and on March 31st a male was heard in song. On April 5th a hen was seen carrying nesting material, but it was not until May 2nd that two nests were found, one being inaccessible, the other containing five eggs. On May 26th a third nest was found containing three young ready to fly. By May 28th the young had flown from this nest and from the second of the two nests found on May 2nd. On July 15th, in the neighbourhood of the first nest found, Siskins were seen feeding young recently out of the nest. There is good reason to suppose that this was a second brood.

In addition to the pairs whose nests were located, at least two, possibly three, other pairs seem to have bred in the vicinity. A party of five or six was seen on June 25th at a locality some distance from that in which the nests were found, and a second pair is believed to have been present in that area. In yet another locality a male and two young were seen on July 5th, a date which suggests that this was another second brood.

Parties of Siskins remained in the area throughout the autumn, but, apart from 20 to 30 on October 1st, and 16 on December 16th, numbers were very small.

In 1948 Siskins again bred in the area and two nests were located. One pair reared a brood successfully, but the other, which was situated in the top of a large Sequoia about 90 feet from the ground, was evidently robbed by some predatory bird or animal.

J. R. COOPER.

BLUE TIT AND STOCK-DOVE SNOW-BATHING.

ON February 22nd, 1948, at 16.30 (G.M.T.) my wife and I watched a Bluet Tit (*Parus cæruleus*), which was having a snow-bath in much the same manner as a bird would take a dust bath. The snow was dry and powdery and about two inches deep. The bird seemed to get considerable satisfaction from its bath and enjoyed the experience for about a minute and a half.

W. D. CLAGUE.

ON February 22nd, 1948, I watched a captive male Stock-Dove (*Columba ænas*) bathing in the snow, which in that part of the aviary was about four inches deep, with every sign of enjoyment. The movements used were in all respects similar to those used in water-bathing. The time was about 12.20 p.m.; the bird in question had been incubating most of the morning and at 1.40 p.m. had again taken over duty on the nest.

I might add that at the time of its snow-bath plenty of unfrozen water was available.

DEREK GOODWIN.

RED-BREASTED FLYCATCHER IN COUNTY DURHAM.

ON October 24th, 1947, Mr. J. R. Crawford of Sunderland saw and clearly identified a Red-breasted Flycatcher (*Muscicapa parva*) on Whitburn Bents on the coast just north of Sunderland, Co. Durham. He thus describes the occurrence:—"On October 24th, a day of continuous drizzle, cold east wind and rough seas, I was on Whitburn Bents when I observed a small slim bird moving in and out of the observation slits in a concrete 'pill-box' constructed during the last war just above high-water mark. When perched its movements were wren-like and when it flew it made typical flycatcher sallies, returning to the pill-box, near which I stood. In flight its most striking character was the unique pattern of its tail—a long rectangular patch of white set on each side for three-quarters of the tail's length contrasting with the dark brown central rib and terminal portions. Its upper-parts were plain olive-brown, under-parts buffish-white, lighter under the tail. I had no difficulty in identifying it as a Red-breasted Flycatcher, no doubt a bird of the year." This is the first record for County Durham. Nine specimens have occurred in the neighbouring county of Northumberland, all but two of them on Holy Island.

GEORGE W. TEMPERLEY.

PROBABLE SCANDINAVIAN CHIFFCHAFF IN SURREY.

ON April 25th, 1948, I saw a small bird on Walton Heath, Surrey, which resembled a Chiffchaff (*Phylloscopus c. collybita*), but the under-parts were whiter. The note was strikingly different from that of the common form, and at once arrested my attention. It was much louder and shriller, and I noticed the resemblance to the cry of a very young chicken in distress, which is described as characteristic of the note of the Scandinavian Chiffchaff (*Phylloscopus c. abietinus*). The call sounded like "tsweep" or

“sweep”, and was sometimes repeated from three to five times in fairly rapid succession; at other times it was a single note. The details I had written down in the field were afterwards compared with *The Handbook* descriptions of the notes of the Scandinavian and Siberian forms of Chiffchaff, and I concluded that the bird I saw was probably *Phylloscopus c. abietinus*.

I was unable to see the colour of the legs, as the bird was never at rest for more than a few seconds owing to the hostility of two Willow-Warblers, which chased the other bird almost incessantly during the hour I had it under observation. I think, however, that the very distinctive note excludes any possibility of the bird being a Willow-Warbler either of the typical or northern race. I visited the heath again on April 26th, but a prolonged search failed to reveal the bird.

HOWARD BENTHAM.

JUVENILE HOUSE-MARTINS BRINGING MUD.

FROM July 20th to 27th, 1947, a party of six House-Martins (*Delichon urbica*) used an aerial, running along the back wall of my house, for a perching place. Two of the birds were adults and the rest juvenile and seemingly independent.

During the day, at frequent intervals, both adult and juvenile birds were observed to bring mud to the wire. A little mud was placed on the wall, more on the wire itself, but most was allowed to fall on to the sloping roof below, after attempts to put it on the other places. In all a great deal of mud was brought, although no nest was built.

The Handbook makes no mention of juvenile House-Martins bringing mud.

K. E. L. SIMMONS.

HOOPOE IN CO. CORK KILLED BY SPARROW-HAWK.

DURING the afternoon of April 2nd, 1948, when walking along the Strand at Shanagarry, Co. Cork, I had an excellent view of a Hoopoe (*Upupa epops*). The bird flew overhead and at once attracted my attention by its curious butterfly-like flight, wide, black and white wings and fanned out black and white tail. Subsequently I got a good view of the crest.

Unfortunately I was not able to watch the Hoopoe for long as it was being chased by a hawk which, from its behaviour and the “elephant-grey” colour of the upper-parts, was evidently a Sparrow-Hawk (*Accipiter nisus*). The Hoopoe flew underneath a gate for shelter and the Sparrow-Hawk perched on top of the gate. After a moment’s pause the Hoopoe rose again and the Sparrow-Hawk dived at it at least four times but—surprisingly, in view of the laboured flight of its quarry—missed each time. Both birds became difficult to follow and eventually disappeared at the foot of a high sea bank. When I reached the spot some ten minutes later, the Sparrow-Hawk rose with something in its talons and flew off heavily. A search along the base of the sea bank revealed numerous tiny downy feathers and 24

feathers of the Hoopoe's crest, but the Sparrow-Hawk had evidently taken the body.

The Hoopoe is recorded in *The Handbook* as an "almost annual passage migrant in spring and autumn to the S. coast" of Ireland, but is not included in the list of birds recorded as the prey of the Sparrow-Hawk.

HELEN F. CAMPBELL.

PURPLE HERON IN PEMBROKESHIRE.

THE following observation I made during the war appears worth recording. It concerns a Purple Heron (*Ardea purpurea*) which I saw on April 21st, 1945, near the coast at Hubberston, Milford Haven, Pembrokeshire. I was making my way through a wet, marshy hollow, skirted by willows and gorse bushes, when a heron arose very close in front of me. It was very dark on the back and wings, and I could clearly see the tawny coloured and heavily striped neck. I got the impression that it was of slighter build than *Ardea c. cinerea*, and had no doubt at all that it was the species referred to.

J. S. WIGHTMAN.

[There appear to be only two previous definite records for South Wales, one recorded as killed on the Usk (E. C. Phillips, *Birds of Breconshire*, 1899) and one near Haverfordwest, April 20th, 1932 (*antea*, Vol. xxvi, p. 23), but Mr. G. C. S. Ingram kindly informs us that one in the Maesllwch collection, Radnorshire, though without data, was probably secured in the neighbourhood.—EDS.]

GANNETS TAKING FOOD THROWN FROM SHIPS.

WITH reference to previous notes on this subject (*antea*, Vol. xli, pp. 26, 123 and 186) I have to record that on January 21st, 1945, two Gannets (*Sula bassana*) followed the cross-channel steamer the entire way from Calais to Dover; many times these birds took refuse thrown from the ship and sometimes remained half submerged for two or three seconds before rising again as described before.

It will be noted that the previous observations have all been from Scotland and the Isles, whereas the present record came from further afield.

J. H. WHITCOMBE.

SPRING OCCURRENCE OF DOTTEREL IN CO. KERRY.

IN March, 1948, I met with parties or "trips" of Dotterel (*Eudromias morinellus*) on two occasions on the Slieve Mish Mountains, S.W. of Tralee, Co. Kerry. On March 14th I saw a trip of about 25 birds just below the summit of Stradbally Mountain, a triangulated peak of 2,627 feet, 3 miles S.W. of Castlegregory. On March 26th two trips of about 20 and 30 birds each were seen a few hundred yards apart on the main ridge of Slieve Mish, near the triangulated point 1,814 feet, 4 miles S.S.W. of Tralee. The same areas were re-visited in the middle of May, but no Dotterel were seen.

The birds were seen on typical Dotterel ground, where the

broad and nearly level ridge was bare of vegetation and littered with stones. They were very tame and confiding and allowed me to examine them from a range of a few yards. The curved white superciliary stripes and crescentic rufous pectoral band across the upper breast were conspicuous. Identification was confirmed by an examination of the coloured plate in *Birds of the Wayside and Woodland*. When first seen they were running about and digging into the ground with their beaks; when put up they flew only a short distance, but on further pursuit they rose as a flock and went wheeling about with quick vibrant flight and pointed wings reminiscent of Golden Plover. They circled once or twice, uttering an attractive shrill peeping cry and then disappeared.

There have been only five previous spring records of the Dotterel in Ireland, and none from the south-west and only one earlier than March. The records are (1) A trip of about 20 birds seen in Co. Down in early April, 1848; (2) A juvenile of first winter obtained in Co. Mayo on February 9th, 1889; (3) Three birds seen in Co. Dublin, April 1919; (4) A record from Antrim, April 22nd, 1925; (5) 20-30 seen in mid-April, 1940, near Tullamore, Offaly.

J. R. SMYTHIES.

BEHAVIOUR OF YOUNG AND ADULT LAPWINGS.

A note by Mr. J. C. Wickens concerned mainly with the share of the sexes in incubation (*antea*, pp.28-9) contains a reference to the behaviour of adult and young Lapwings (*Vanellus vanellus*) which indicates that although details of the subject must be familiar to some observers, few have hitherto been published. The displacement feeding of adult Lapwings when uneasy and of chicks after handling for instance, is by no means unusual. Both Coward (*Birds of the British Isles*, Vol. ii, p.200) and, more recently, Armstrong (*Bird Display and Behaviour*, p.100) have noted it.

Unlike young Oyster-catchers (*Hamatopus ostralegus*), which lose all tendency to squat as soon as they can fly (Dewar, *antea*, Vol. xiii, pp. 207-13), juvenile Lapwings will sometimes crouch and allow themselves to be caught even when they are capable of sustained flight. The impulse to squat persists in post-breeding flocks, where immatures, on alarm, often crouch momentarily before taking wing with the rest.

The reactions of adult breeding Lapwings to humans vary considerably. Some are not very demonstrative, even at hatching-time, but one with chicks in the nest on May 6th, 1948, gave a frenzied display, calling loudly and running round me, spasmodically partly extending and shaking its wings. Another, about a fortnight later, with newly-hatched chicks which Mr. A. Welch and I disturbed crossing a road in Orkney, ran just in front of us, uttering a sharp "kiwi" note quite different from the usual alarm-call, and, like the former bird, persisted in nervously and uncertainly shuffling one, and sometimes both wings. We should have classed this as inappropriate behaviour

elicited by sudden agitation (*vide* Armstrong, *op. cit.*) or possibly as distraction display of the type commonly termed "injury feigning", but read in *The Handbook* (Additions and Corrections) that Mr. D. Nethersole-Thompson has seen a similar performance employed *aggressively* against "... rival males and other animals or exceptionally humans, approaching young or chipping eggs." K. G. SPENCER.

FLOCK OF OYSTER-CATCHERS INLAND IN WINTER.

WHILE observing duck on a local gravel-pit in Nottinghamshire on January 9th, 1948, the observer and a friend noticed a flock of eighteen Oyster-catchers (*Hæmatopus ostralegus*) proceeding up the Trent Valley in a southerly direction. They were at a height of approximately 100 feet, and about a quarter of a mile away. The following details were observed through 8x binoculars and a 25x telescope. About gull-size, but wings shorter and beats much quicker. Black and white markings, and white bar and rump. White under-parts and long bill conspicuous. Unfortunately the light was not good, and the colour of legs and bill could not be distinguished.

Both observers are acquainted with this species, as they have spent some time amongst them on the North Norfolk coast, and are satisfied as to the identification. This is the first record of a flock of Oyster-catchers in the county, and the first occurrence for a winter visitor in Nottinghamshire to my knowledge.

D. F. CULLEN.

BLACK TERNS ON LOUGH REE.

ON May 21st, 1948, in the very centre of Lough Ree a party of eight Black Terns (*Chlidonias niger*) flew across the bow of my boat. They were flying fast from the south and alighted on Nun's island for a short time before continuing northward with purposeful flight. The white under tail-coverts were noticeable as the birds flew past and the very black under-parts contrasted with the greyer upper-parts when they rose and took flight from the island.

As mentioned when recording two Black Terns seen only twenty-five to thirty miles away in May, 1947 (*antea*, Vol. xl, p. 377), this tern is rare in spring and quite exceptional in non-maritime counties in Ireland. So many together is of very rare occurrence.

ROBERT F. RUTTLEDGE.

COMMON TERN PERCHING ON FLOWER-HEAD.

(See Plate 10).

THE *Handbook of British Birds* mentions that the Arctic Tern (*Sterna macrura*) will perch on small pine trees in the forest belt of Northern Europe, but does not mention a similar habit in any tern in the British Isles.

It would therefore seem worth while to publish the accompanying photograph, which although not technically very good shows a

Common Tern (*S. hirundo*) perching on the flower of a Cow Parsnip plant. It was taken in June, 1943, on "Donnan Isle", in Strangford Lough, Co. Down, Northern Ireland. The bird continued to use the flower for perching while the writer, in company with another observer, remained on the island, but unfortunately it was not possible to return to the place again for further observation.

J. MCGIFFERT.

ARCTIC TERN PERCHING ON TELEPHONE WIRE.

AN Arctic Tern (*Sterna macrura*) was seen to perch on a telephone wire running across a creek at Teesmouth, Co. Durham on May 24th, 1948. Although there was a strong breeze the bird balanced on the thin wire quite easily and did not see-saw after the manner of such birds as the Starling. The bird was viewed with telescope (25x) at about 50 yards and I am satisfied from the blood-red colour of the bill that it was an Arctic and not a Common Tern (*Sterna hirundo*). As I live on the coast I am familiar with the distinction between the two species.

J. C. COULSON.

FEEDING BEHAVIOUR OF BLACK-HEADED GULLS.

IN the late evening of May 13th, 1948, I observed 5 Black-headed Gulls (*Larus ridibundus*) feeding in shallow pools left by the retreating tide at Llanfairfechan, N. Wales. The birds behaved in what appears to be a most unusual manner by running rapidly through the water with neck outstretched and bill just beneath the surface. It was noticeable that they did not repeat this procedure on any given area of water, in fact they worked progressively seawards from pool to pool.

N. W. HUSSEY.

LARGE CLUTCHES OF COMMON GULL.

ON May 22nd, 1947, I found a nest of the Common Gull (*Larus canus*) containing five eggs. The nest was situated on a small island in the middle of a large loch in Sutherland. There were about twenty-five nests on the island, and most of them contained three eggs.

Apart from the fact that *The Handbook of British Birds* (Vol. v, p. 81) states that there are only two previously recorded cases of clutches of five, this particular case is of interest because within a few feet of this nest was another nest containing four eggs, which is also stated to be rare. In each case the eggs appeared to have been laid by one female, and not by two, as suggested in the case of the clutch of six recorded in *The Handbook*, for the eggs in their respective clutches were almost identical in colouring, size, shape and markings. Furthermore the possibility of these clutches having been made up by practical jokers can really be ruled out owing to the remoteness of the locality.

The accompanying photograph (plate 10) shows the clutch of five eggs.

R. CASEMENT.

COMMON GULL BREEDING IN ITS SECOND YEAR.

I have already (*antea*, Vol. xxxix, p. 127) hinted at the possibility of the Common Gull (*Larus canus*) breeding in its second year. I have now been able to prove that such instances do in fact occur.

On April 24th, 1948, I found a marked bird which I judged to be a female accompanied by an obvious male. A few days later these birds had taken up a "stand". Using a telescope I found the marked bird to be number 327581 which my records show as having been ringed in this colony on June 25th, 1946, thus proving in addition to the presence of an almost complete sub-terminal band on the tail, lack of mirrors on the noticeably brown primaries, subterminal band on the bill and dark patches at the carpal point that the bird was undoubtedly in its second year.

On May 14th this pair had a nest and a few days later I disturbed the marked, second year plumaged, bird from its nest containing three eggs. Incubation was regular and still in progress on June 2nd. Unfortunately I was away at the time when hatching would have taken place so cannot prove that breeding was successful. The nest gave some indication that it had been occupied by young and the second-year bird was present on its "stand" on July 1st, though I was unable to be certain whether any of the young birds present were hers.

I also found a male and female, both in second year plumage and obviously paired, on May 7th. The male bore British Museum ring number 327590 which I had placed on it at this colony on July 6th, 1946, thereby proving the bird to be in its second year.

Though these birds held a "stand" and coition was witnessed on May 9th and considerable display on May 16th, there was no evidence that they made a nest.

ROBERT F. RUTLEDGE.

HERRING-GULL WITH YELLOW LEGS IN DORSET.

On June 8th, 1948, my wife and I were watching Herring-Gulls (*Larus argentatus*) breeding on chalk cliffs between the Foreland and Ballard Point, near Studland, Dorset. To our surprise, one adult of an apparent pair standing together on a ledge had deep yellow legs and feet, very similar in hue to that of its bill, though at very close range the bill-colour was brighter, probably due to the smooth surface. There was a slight orange tinge to the yellow of legs and bill, very similar to that of another adult's bill, some yards away, but quite distinct from the bright lemon-yellow of the bill of the bird (? mate) with which the first was standing. The latter had legs and feet of the normal flesh-pink colour, as did all the other adult Herring-Gulls examined (more than 50).

A detailed comparison between the two standing together, in a good light at 15-30 yards range from two different angles, using binoculars and telescope, showed no difference in shade of mantle (pale blue-grey) or in other plumage details and no trace of immature or winter plumage on either, but the yellow-legged bird seemed slightly larger (? male). There was no nest visible where

they were standing, and no proof of breeding, but there were many nests with eggs and young on the adjoining cliffs and stacks, and it seems probable that the yellow-legged bird was breeding locally.

The circumstances suggest strongly that this may have been a variety of *L. a. argentatus*, rather than a wanderer of one of the yellow-legged races. The possibility of its being a hybrid *L. argentatus* \times *L. fuscus* has to be considered. *The Handbook* (Vol. v. p. 94, footnote) states that the two species do not interbreed in N.W. Europe. *Larus fuscus graellsii* was first proved to breed in Dorset in 1944 (Portland) and odd birds occur among Herring-Gulls at various places on the coast in summer. On June 8th and 13th, 1948, there was a single adult British Lesser Black-backed Gull among the Herring-Gulls on the cliffs where the yellow-legged bird was seen. There does seem to be a possibility that hybridization between the two species may occur under such conditions.

K. B. ROOKE.

PIED WAGTAIL FEEDING ON BREAD CRUMBS.—Mr. V. S. Edwards has reported to us a case of a Pied Wagtail (*Motacilla alba yarrellii*), which fed regularly during the summer from May 3rd, 1948, onwards on bread crumbs put out on a flat garage roof at Ditchingham, Norfolk. On August 9th, it was seen to take a good-sized piece of bread and carry it to the ground in order to feed two juveniles, and on the 11th, the two young birds were seen feeding with the adult on crumbs on the roof.

PARTRIDGE AS PREY OF MONTAGU'S HARRIER.—Flt.-Lt. D. M. Turner Ettlinger informs us that on April 4th, 1948, near Wunstorf, Germany, he disturbed a female Montagu's Harrier (*Circus pygargus*) in the act of feeding on an adult Partridge (*Perdix perdix*). We know of no similar record.

LARGE NUMBER OF WHIMBREL INLAND IN SOMERSET.—Mr. John C. Walker informs us that on May 1st, 1948, a party of about forty Whimbrel (*Numenius phaeopus*) was seen by himself and Mr. B. B. Fry on Kenn Moor, North Somerset. The birds were watched with glasses at less than 100 yards range and particulars have been supplied. Such a large party in an inland locality is quite unusual.

LITTLE GULL IN NORTH ESSEX.—Mr. Reginald W. Arthur sends the following recent records of the Little Gull (*Larus minutus*) in north Essex: An immature bird found dead on St. Osyth beach, November 4th, 1947; an immature bird seen over Colne Marshes, Alresford, January 17th, 1948; an adult in winter plumage over Howlands Marshes, St. Osyth, January 24th, 1948; and an adult in breeding plumage at Leewick beach, May 10th, 1948.

EARLY GLAUCOUS GULL IN THAMES ESTUARY.—Messrs. A. L. Chopping and M. J. Ardley report a Glaucous Gull (*Larus hyperboreus*) seen by them at Canvey Island, Essex, on September 18th, 1947.

LETTERS.

VOLUNTARY WATCHERS.

To the Editors of BRITISH BIRDS.

SIRS,—The Royal Society for the Protection of Birds is again appealing for voluntary watchers for service in certain vital areas in 1949. Applicants must be strong and active, and must have a good field knowledge of British birds.

Volunteers are normally expected to travel up to 300 miles at their own expense. During their spell of watching they may be accommodated in either tents or huts. Basic camping-equipment is supplied at the sites, so that only a minimum of gear has to be carried. Under normal circumstances the cost to the individual, after the payment of rail-fares, works out at less than £1 per week. Volunteers may offer their services for spells of 7, 14 or 21 days (or longer) but periods of duty must begin and end on a Saturday. Volunteers will normally work in pairs.

The advantages which accrue from this scheme are very wide in scope. First and foremost, it enables certain vital areas to be properly protected. Secondly, it makes it possible to collect a long series of accurate observations extending over a period of months. The knowledge thus obtained is not only often of great scientific value, but it is also of fundamental importance in planning future conservation measures in the area.

Volunteers will be required at a number of places in 1949 from the beginning of April until September. Further particulars will be given on application to the Director of Watchers and Sanctuaries, R.S.P.B., 82 Victoria Street, London, S.W.1.

PHILIP BROWN.

SONG-PERIODS.

To the Editors of BRITISH BIRDS.

SIRS,—I am much interested to see Mr. Alexander's letter in your September issue on the Charts of Bird-Song. When these first appeared (in *British Birds*, Vol. xxix, (December 1935) pp. 190-198) I wrote rather a long letter, which appeared in your columns in February, 1936 (pp. 294-6). I may say that this is a branch of bird study which has always particularly interested me, and I have systematic Cheshire records covering half-a-century, at any rate of the more familiar species. My former letter is much too long to refer to in detail again, but I have studied it carefully afresh and can confirm all the observations and suggestions which it contains. I say this because after comparing my records with those in the Charts I do not find that much use, if any, has been made of them. I feel that if Mr. Alexander will look through my letter again, he will find some useful information regarding certain species which he now seems puzzled about. I am sorry that I happened to lose touch with *British Birds* for a few years, and so regrettably missed knowing about the "Bird-Song Enquiry" published in Vol. xxxvi: these particular parts I am now trying to obtain. In his recent letter, Mr. Alexander finds that many observers living in the lowlands of Britain seem to think that his published song-periods for the common species were too long rather than too short. I have not thought so; and surely Mr. Alexander is right in publishing the earliest and *latest* dates for which he has records! Several writers seem to have found the Willow-Warbler "silent for almost the whole month" of July. The song then certainly becomes extremely limited and frail for a time—often a mere flicker—but it definitely rallies towards the month end. At least that is my long experience. It is always a particular pleasure in the quiet season of bird-life to listen for and enjoy this slender thread of music of the Willow-Warbler, and also the Robin's gentle warble. The Hedge-Sparrow in Cheshire sings in every month of the year, more or less; its autumn song becomes conspicuous in October, and it sings all winter, with a notably fresh volume of song in January, which occurs even with the slightest encouragement in the midst of long and hard seasons. I have many dates for the Song-Thrush's song in August, all through the month; the voiceful birds are limited, and their song—unlike the loud and robust voice in spring—is quiet and pensive. The song of

the Thrush is to be heard in every month of the year. Also that of the Blackbird, of which I have many records for August; I find the earlier voices that month are usually normal in strength, latterly it is the whispered song that we hear. In whispered song the Blackbird excels. In my experience, not only Song-Thrushes and Blackbirds but most birds sing longer in moist summers than in dryness and heat.

As regards the Quail, till recent years my latest song-date in Cheshire was July 18th; now I have three later dates to record, the latest being August 15th.

JAMES J. CASH.

22 JAN 1949
REMOVED

GAIT OF BUNTINGS.

To the Editors of BRITISH BIRDS.

SIRS,—With reference to the correspondence on this subject (*antea*, Vol. xli, pp. 96, 286) on May 2nd, 1948, I watched a male Cirl Bunting (*Emberiza cirlus*) on a disused hard tennis-court at Exmouth, Devon. It both hopped and ran. I feel sure I have seen Cirl Buntings run on previous occasions, but made no note of it.

A. HOLTE MACPHERSON.

BIRDS ROBBING OTHER BIRDS OF FOOD.

To the Editors of BRITISH BIRDS.

SIRS,—This habit, well established among certain sea-birds, is perhaps commoner among terrestrial birds than recent notes (*antea*, Vol. xl, p. 340, Vol. xli, p. 213) would suggest. I have a note of Wood-Pigeons (*Columba palumbus*) robbing House-Sparrows (*Passer domesticus*) of their food, in Hyde Park, London, on July 2nd, 1934. In a recent issue of *The Countryman* (Vol. xxxv, p. 219, 1947), Miss D. J. Brooks recorded twice seeing a Blackbird (*Turdus merula*) rob a Lapwing (*Vanellus vanellus*), sitting by while it foraged and seizing the worm before it could be swallowed. As long ago as 1855, J. Y. Akerman (*Zoologist*, p. 4702) recorded seeing House-Sparrows snatching worms from the laden beaks of Starlings (*Sturnus vulgaris*), which were collecting food for their young on the lawns of the Temple, in the City of London.

R. S. R. FITTER.

ALLEGED BREEDING OF BITTERN IN LANCASHIRE.

To the Editors of BRITISH BIRDS.

SIRS,—At least two statements to the effect that the Bittern (*Botaurus stellaris*) bred in North Lancashire in 1947 have appeared in the daily press over the initials of two nature-journalists, and have been copied elsewhere. The facts as known to me are these. It is about ten years since the Bittern became a regular inhabitant of Leighton Moss. Every spring a male has been heard booming and every autumn and winter when the duck shoots take place a Bittern, or sometimes two, has been flushed by the beaters, and single birds have been seen in the moss at other times. The gamekeeper, myself and others have looked for a nest in what we thought were likely parts of the reed-beds, in 1947 and in other years. As far as I am aware no one has ever seen a young bird, a nest of eggs, or even broken egg-shells. A clutch of eggs supposed to have been taken at Leighton Moss is said to be in the possession of a collector, and a dealer is said to have sold a clutch of eggs taken here, but no reliance could be placed on data from either source. The position now is the same as it was ten years ago, i.e., not a shred of proof of breeding exists. But once a fairy tale has appeared in print, even in the daily press, it is eagerly copied by some nature-writers of that type, regardless of whether it is proven fact or wild surmise. If a nest is found the obvious course is to call in an ornithologist of repute as witness and, may I add, to keep the matter secret until after the young have flown.

R. A. H. COOMBES.

[We heartily agree with Mr. Coombes's remarks. The irresponsible publication of unproved or fanciful records as though they were established facts may be a source of great confusion in later years and cannot be too strongly condemned.—Eds.]

NOTICE TO CONTRIBUTORS

British Birds accepts papers and notes dealing with original observations on the birds of the British Isles and Western Europe or, where appropriate, on birds of this area as observed in other parts of their range. Review articles on subjects of current ornithological interest will also be considered.

Contributors are asked to observe the following points, attention to which saves the waste of much editorial time on trivial alterations. MSS. if not typed should be clearly written. Authors of papers, especially those containing systematic lists, lists of references, tables, etc., should consult previous papers on similar lines in *British Birds* as a guide to general presentation and set-out, including use of particular type, stops, and other conventions, such as date following the month (January 1st, etc., not 1st January), names of books and journals in italics, not inverted commas, and so on. Capital initial letters are to be used for proper names of definite species: thus "Great Tit," but "flocks of tits." [In systematic lists the whole name should be in capitals]. The scientific name (underlined in MS. to indicate italics) follows the English name in brackets without any intervening stop. Scientific nomenclature follows *The Handbook of British Birds* or H. F. Witherby's *Check-List of British Birds* based on this, with the qualification that subspecific names should not be used in connexion with field observations except in cases where subspecies are definitely separable in the field, e.g. Yellow and Blue-headed Wagtails, or where their use is necessary in discussion. When the subspecific name (in cases where this is used) repeats the specific name the initial letter only should be used for the latter; otherwise the whole name should be given in full: thus "*Parus m. major*," but "*Parus major newtoni*."

Notes should be drawn up in as nearly as possible the exact form in which they will be printed, with signature in BLOCK CAPITALS, and the writer's address clearly written **on the same sheet**. If more than one note is submitted each should be **on a separate sheet** with signature and address repeated. Though suitable headings and scientific names can be added by the Editor, if necessary, they should be inserted by authors as far as possible. Communications should always be as concise as possible, though reasonable detail can be given where this is important. Notes or records of subsidiary importance may be abbreviated or otherwise modified by the Editor for inclusion in the section of "Short Notes." Maps or graphs must be **neatly** and **boldly** drawn in Indian ink on good quality white paper or Bristol board, with due allowance for reduction when necessary. Authors without experience of making drawings or diagrams for publication are strongly advised to get the help of a skilled draughtsman. Lettering and figures should be inserted lightly in pencil only.

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It is desirable that reports of rare birds should be sent in immediately, as sometimes authentication of a noteworthy record may depend on further observation after advice has been obtained. Such records or other communications of special urgency may be addressed direct to the Editor of *British Birds*, 9, Marston Ferry Road, Oxford, but in general all notes and papers for publication and other editorial communications should be addressed to the Assistant Editor, *British Birds*, 74, Shinfield Road, Reading. Enquiries or requests for information not immediately related to material for publication must be accompanied by a stamped and addressed envelope.

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BIRDS OF THE NORTH ATLANTIC IN MARCH

BY

N. W. CUSA.

INTRODUCTION.

I crossed the North Atlantic in an easterly direction during the latter part of March, 1947, and during the whole voyage I made such observation of birds as was practicable in the very bad weather encountered. The crossing was made in the motor-vessel "Sacramento". She left Brooklyn about 3 p.m. on March 20th and, by way of the Pentland Firth, reached the Humber in the early hours of April 2nd. A north-westerly gale accompanied by snow and sleet and lasting several days was encountered off Nova Scotia. It was of such severity at times that the ship was compelled to heave-to during one night. Again in waters west of the Hebrides headwinds materially reduced the speed of the ship throughout a period of several days. During the greater part of the voyage high seas diminished the possibility of discerning small birds on or near to the surface of the water. On one of the calmest days there was some fog. Driving spray, downpours and cold winds, rather than observational convenience, determined the look-out position and the duration of watches. These circumstances are mentioned as possibly detracting from the representative character of such observations as it was possible to make. But for any value they may have in helping to elucidate the distribution and movements of oceanic species the observations are here placed on record. There are few ornithological records of Atlantic crossings in March.

I have first recorded observations factually in diary form. The times given are the local times. Distances are in Nautical Miles. Commentary follows under specific headings. Only the oceanic part of the crossing is referred to in this account; observations in the North Sea are reported separately. Birds were watched usually through 6 x 30 binoculars, in special circumstances through a 35x telescope. Sub-specific distinctions were not attempted in the "field" and are not made in this report. I am indebted to Ellerman's Wilson Line, Ltd., for the courteous provision of navigational data and for permission to publish it. I am also indebted to A. W. Boyd and to Prof. V. C. Wynne-Edwards, who have read this paper in draft and have kindly and helpfully commented upon it.

OBSERVATIONS.

March 20th.

Weather notes:—Clear, calm, sunny.

Hours of observation:—3.00—6.00 p.m.

During this period the ship passed through smooth waters from Brooklyn Docks to the Ambrose Lightship. The only birds observed were numberless Herring-Gulls (*Larus argentatus*) both in attendance on the ship and passing to and fro over the water, and, among them, up to twelve Great Black-backed Gulls (*Larus marinus*).

March 21st.

Noon position:—40° 18' N., 68° 50' W.

Weather notes:—High wind, high sea, low cloud, some snow.

Hours of observation:—7.30—8.30 a.m., 1.30—3.30 p.m.

Herring-Gulls still in attendance, fewer than on the previous day but still frequently as many as twelve in view at one time, nearly all adult birds. The only other bird seen was a single Kittiwake (*Rissa tridactyla*) at 2.30 p.m.

March 22nd.

Noon position 40° 14' N., 65° 16' W.

Weather notes:—High wind, high seas, cloud higher than on previous day, rain squalls with some snow, occasional sunshine.

Hours of observation:—9.00—11.00 a.m., 2.00—3.00 p.m.

Herring-Gulls in attendance on the ship. About thirty present throughout the day, one or two in brown plumage. For short periods two Great Black-backed Gulls were present among the Herring-Gulls. Kittiwakes, six during the day, two of them tarrocks, were seen at long intervals flying independently. None at any time joined the flock of gulls near the ship.

March 23rd.

Noon position:—41° 14' N., 59° 41' W.

Weather notes:—High wind, high seas, low cloud, continuous sleet.

Hours of observation:—9.00 a.m.—12.00 noon. In the afternoon an occasional look-out only.

Herring-Gulls in attendance on the ship were few, varying in number from none to five. Great Black-backed Gulls were absent. Of Kittiwakes there was usually at least one in sight, at times flocks of as many as six. Some birds were immature. The Kittiwakes were all travelling more or less in the direction of the ship, overhauling her and moving away ahead.

March 24th.

Noon position:—42° 19' N., 57° 00' W.

Weather notes:—Sunny, high patchy cloud, sea abating, warmer, gusty wind.

Hours of observation:—9.00 a.m.—12.45 p.m., 2.00—5.30 p.m.

Herring-Gulls in the vicinity of the ship varied in number from none to about twelve. Two Great Black-backed Gulls were present among them from about 9.00—10.00 a.m. Kittiwakes were passing much as on the previous day. At about 10.00 a.m. an adult Iceland Gull (*Larus glaucoides*) approached the ship from the south, crossed the bows close in and passed to the stern; it spent about five minutes with the attendant flock of gulls, then drifted away to the north-west. It had distinctly more slenderly proportioned wings than had the Herring-Gulls which were present at the same time. It was also markedly smaller than these birds. About 2.30 p.m. a small petrel was seen far away. It had a white rump. From 2.30 p.m. until the end of the watch at intervals unidentified auks, nine in all, were seen flying near the surface of the water.

March 25th.

Noon position:—43° 28' N., 49° 36' W.

Weather notes:—Clear and sunny, little wind, sea moderate.

Hours of observation:—8.00—8.30 a.m., 9.00 a.m.—12.45 p.m. 2.30—4.30 p.m., 5.00—6.30 p.m.

On this day, the ship being near the Newfoundland Grand Banks, there was an astonishing concourse of birds on the sea. Especially was this the case in the early morning as the ship passed through green shallows at the Tail of the Bank. Wherever one looked, in whichever direction, near or far, there were to be seen in the air countless numbers of Kittiwakes and Fulmars (*Fulmarus glacialis*), and, on the sea or flying near the surface of it, innumerable auks. Whenever an auk was seen close enough to the ship to permit of certain identification it proved to be Brünnich's Guillemot (*Uria lomvia*) and it is believed that this species comprised by far the greater number, if not the whole.

of the myriads of auks encountered. The numbers of birds began to diminish after about 10.30. a.m., but parties of each species were constantly in sight until the end of the day's watch. Only two Herring-Gulls were seen during the day, in the early morning, but a flock of Great Black-backed Gulls up to fifteen in number, was in attendance on the ship throughout the day.

March 26th.

Noon position:— $47^{\circ}02'N.$, $43^{\circ}26'W.$

Weather notes:—Fog until 11.15 a.m.; afterwards, clear, cold and sunny, little wind, sea relatively calm.

Hours of observation:—9.30 a.m.—12.45 p.m., 2.00—3.30 p.m., 4.00—5.30 p.m.

One Herring-Gull only, an immature bird at 12.30 p.m., seen all day. Three Fulmars were seen at intervals during the morning. None later. A Glaucous Gull (*Larus hyperboreus*) passed near the ship flying on a nearly opposite course. It was not a fully mature bird. It was generally creamy-white in plumage, paler than the buff birds seen later in the North Sea. It was larger, and broader of wing, than is a Herring-Gull and more slow and ponderous in movement. Auks were encountered in small parties at intervals during the morning. Two were possibly Razorbills (*Alca torda*), the rest almost certainly Brünnich's Guillemot. Throughout the day the most numerous species was the Kittiwake. At all times these birds could be seen, sometimes in large parties. During the morning the birds were for the most part passing on a contrary course to the west and south-west. None followed the ship, which was for the first time without an escort of birds. When the watch was resumed even larger numbers of Kittiwakes were to be seen, a large but changing flock in the wake of the ship and, scattered over the sea, constant large parties moving now in the same direction as the vessel. The numbers diminished towards evening but remained large until dark.

March 27th.

Noon position:— $50^{\circ}44'N.$, $37^{\circ}38'W.$

Weather notes:—High continuous cloud, warm south wind, sea still relatively calm.

Hours of observation:—9.00 a.m.—12.30 p.m., 2.00—3.30 p.m., 4.00—5.00 p.m.

There were on this day notably fewer birds than on the previous day. Occasional small parties of Kittiwakes were encountered. One or two birds in the morning were in the wake of the vessel and by noon there were eight and in the afternoon a flock of fifty or more. One adult bird lacking the terminal portion of the lower mandible and carrying its legs not quite fully retracted but otherwise in seemingly good condition was first noticed just after noon and was present near the ship during the remainder of the day. Auks were encountered singly and in small parties throughout the day, frequently at short range. One Puffin (*Fratercula arctica*) was seen and several of Brünnich's Guillemot were certainly identified. The remainder were probably Brünnich's Guillemot. A Great Skua (*Stercorarius skua*) appeared at 11.00 a.m. and one, apparently the same bird, was seen at intervals during the day.

March 28th.

Noon position:— $53^{\circ}38'N.$, $30^{\circ}32'W.$

Weather notes:—Much cloud, some sun, wind rising from the south, sea rising.

Hours of observation:—9.00 a.m.—12.00 noon, 2.00—5.00 p.m.

Kittiwakes were in sight all day on the sea and a party followed the ship. The injured bird noted on the previous day was again present. Auks were encountered in occasional small parties and one at least was quite certainly Brünnich's Guillemot. The bill characters were clearly seen at very close range. One Fulmar was seen about noon. Great Skuas, sometimes one, usually two, on one occasion three, were at most times visible from the ship.

March 29th.

Noon position:— $56^{\circ}14'N.$, $23^{\circ}31'W.$

Weather notes:—High seas rising higher, high head wind, rain early, sun later in the morning, totally cloudy after noon.

Hours of observation:—9.00 a.m.—12.00 noon, occasional lookout after noon.

Kittiwakes followed the ship in small numbers including the injured bird most of the morning and again at 5.00 p.m. A large flock of Fulmars was present. far astern, all day.

March 30th.

Noon position:— $57^{\circ}39'N.$, $17^{\circ}56'W.$

Weather notes:—Showers and sunshine, high wind, heavy seas ahead.

Hours of observation:—9.30 a.m.—12.00 noon, 5.00—6.30 p.m.

Some few Kittiwakes and a large number of Fulmars were following the ship. The Kittiwakes were close astern, the Fulmars far out in the wake. Two unidentified auks were seen during the day.

March 31st.

Noon position:— $58^{\circ}28'N.$, $10^{\circ}10'W.$

Weather Notes:—Sunshine and shower, sea and wind moderating, cold.

Hours of observation:—9.00 a.m.—12.30 p.m., 3.45—5.30 p.m.

Kittiwakes and Fulmars were present in the wake of the ship, more Fulmars, fewer Kittiwakes than on the previous day. Herring-Gulls, two adult one immature, were present with the birds in the wake during the afternoon. Several Gannets (*Sula bassana*) were seen at intervals flying near the surface of the sea. They were not seen to plunge. The only auks encountered were two birds clearly identified as Common Guillemots (*Uria aalge*).

April 1st.

Noon position:—6 miles from Rattray Head.

Weather notes:—Sunny, some high cloud, little wind, sea quite calm.

Hours of observation:—6.45—8.30 a.m., 9.00 a.m.—12.45 p.m., 2.00—3.30 p.m., 4.00—6.00 p.m.

The ship passed through the Pentland Firth into the North Sea at about 7.00 a.m. Observations are therefore recorded separately (*Brit. Birds*. Vol. xli, p. 159).

COMMENTARY.

KITTIWAKE.

Far more individual birds of this species than of any other were seen during the voyage. None was seen in Long Island waters on the afternoon of sailing. On the first day out one only was seen and on the next day six. Thereafter, until the ship passed through the Pentland Firth, numbers were seen each day at times large enough to defy the crudest estimation. Particularly large numbers were seen in the region of the Tail of the Bank and again, to the north-east, about $47^{\circ}N.$, $43^{\circ}W.$, where there were signs that a migration of these birds was in progress. The spring anadromous migration of this species (which Wynne-Edwards, *Proc. Boston Society of Natural History*, Vol. 40, p. 323, places in the latter part of April) had, however, apparently not become effective to drain the oceanic waters the ship passed through. Alexander, however (*vide* Nicholson, *Brit. Birds*, Vol. xxxix, p. 267) found apparently no Kittiwakes between $9^{\circ}W.$ and $38^{\circ}W.$ and generally few until he reached Newfoundland waters on a voyage in the first half of March. He was, however, travelling generally on a more southerly course than I was. The same is true of VENABLES (*Brit. Birds*, Vol. xxxi, p. 295), who saw only thirty-nine Kittiwakes and indeed very few birds of any kind, on a rapid voyage between March 19th and March 23rd. These observations suggest that already in March a withdrawal from the more southerly parts of the North Atlantic is in progress. More recently

Rankin and Duffey (*Brit. Birds*, Special Supplement, July, 1948) have found few Kittiwakes in mid-ocean at 45°N. This withdrawal is not perhaps conspicuous in more northerly latitudes until well into April.

Kittiwakes were only to be seen in the wake of M.V. "Sacramento" when the larger coastal gulls were absent. These escorting birds were rarely seen to pay attention to refuse cast from the ship and their attendance seemed rather to arise from pleasure in riding the rising currents of air from the vessel. This individual birds were observed to do continuously for hours at a time without interruption for other activity. In the North Sea a party of about a dozen Herring-Gulls was seen chasing and attacking a Kittiwake, and seemingly such persecution accounts for the Kittiwake's absence from among the birds escorting a ship until the larger coastal species are left behind.

A fairly high proportion (perhaps 20%) of the Kittiwakes seen were in characteristic "tarrock" plumage bearing grey-black diagonal marks on the upper surface of the wings. Of the remaining birds most, however, were in a plumage bearing apparently only some remnants of the "tarrock" pattern. Thus a typical bird was feathered as is the adult in summer but with a small grey-black area around the eye and a grey-black band on the nape and side of the neck. In many birds this neck-band was a double bar of which the anterior portion was the darker and the longer. Grey-black on the ear coverts was absent.

That a bird with injuries establishing its individual identity was seen about the ship on three successive days is noteworthy in view of the discussions of similar occurrences by Wynne-Edwards (*loc. cit.*, p. 320). At no time was this or any other Kittiwake seen to alight on the ship nor was this particular bird seen to alight on the water although parties of Kittiwakes swimming on the surface were frequently encountered.

FULMAR.

The Fulmar was not seen until the early morning of March 25th, when the ship passed nearest to the Newfoundland Grand Banks. On that day and especially in the morning while the ship was passing through the pale green shallow waters of the Tail of the Bank this species was present in astonishing multitudes. These great numbers diminished rapidly as the ship passed into the blue and deeper water but there were still occasional parties to be seen up to the end of the day's watch. On the following day only one was seen and on the next day (noon position 50° 44'N., 37° 38'W.) there were none. The day after that there was again one. On subsequent days of the voyage (26°W. and eastward) the species was seen in numbers again, though never in numbers nearly as great as in Newfoundland waters. On the Bank they were scattered in every direction over the ocean; in the eastern Atlantic there were parties following the ship but usually very few out on

the ocean. This is in accordance with the findings of Wynne-Edwards (*loc. cit.*, p. 273) inasmuch as he found the greatest numbers in the earlier (May) crossings in the western half of the Atlantic.

By contrast Rankin and Duffey (*loc. cit.*) do not seem to have observed such great concentrations at this season near Newfoundland.

Wynne-Edwards (p. 274) comments that the Fulmar not only usually keeps clear of land but also of shallow water. Thus "In May not a single bird was seen by me on the Grand Banks, which I crossed twice, though on passing out of soundings they appeared as if by magic, within a mile or two of the 100 fathom line." Strikingly I found the Fulmar, by contrast, in greater numbers in the area of shallow waters on the Banks and it might almost be said that the species *disappeared* as if by magic as one passed into deeper water. The great gathering on the Tail of the Bank is the more remarkable in that the Fulmar does not breed in Newfoundland, nor indeed in North America south of Baffin Land. It is to be noted that Alexander (*loc. cit.*) passing through very nearly the same waters and on nearly the same date saw only two or three Fulmars (cf. H.G.A., 20.3.45, 43° 16'N., 50° 15'W.; N.W.C., 25.3.47, 43° 28'N., 49° 36'W.).

The Fulmar was absent from the wake of the ship in coastal waters even when present on the ocean away from the vessel. This is probably, as is surmised is the case with Kittiwakes, on account of its being harassed by the large coastal gulls.

Although in the eastern North Atlantic large parties followed the ship they usually did so far astern, forming a separate group quite distinct from the nearer flock of Kittiwakes. It may be surmised that their interest is less in the discarded refuse which attracts Herring-Gulls and less in the buoyant air-currents which it is suggested attract Kittiwakes than in some advantage to feeding in the relatively smooth water which stretches far into the wake of a ship in a rough sea.

BRÜNNICH'S GUILLEMOT.

There were myriads of auks on the Tail of the Bank. They were scattered over the water as far as one could see with a telescope and besides the swimming birds there were numerous large flocks in flight, for the most part moving northward. The ship was constantly for several hours passing among crowds of swimming auks. These birds usually dived as the vessel approached but many flapped and scuttered over the surface of the water in a helpless manner, apparently trying to fly but unable to rise without the purchase of a wave-crest. I examined the nearest flocks continuously throughout the day's watch, and frequently a more than usually inquisitive bird presented excellent views at very close quarters. I saw no auk which was not either certainly or very probably Brünnich's Guillemot. In contrast

with the Common Guillemots seen later in northern Scottish waters, all of which appeared more or less brown, these birds on the dark parts of their plumage were black which glistened a neutral grey without in any area a discernible suggestion of brown colour. The bill was conspicuously shorter and deeper than in the Common Guillemot, more nearly continuous in outline with the head and imparting a characteristic bluntly pointed shape thereto which one came confidently to recognize at ranges where the distinguishing pale mark on the basal edge of the upper mandible could not be discerned. A large number of birds, however, were seen close enough clearly to perceive this pale line at the base of the bill. Scuttering away from the observer the birds presented a conspicuous black and white pattern and a rather ridiculous fat-rumped and helpless appearance. There was much white laterally on the rump with a narrow black line connecting black back to black stubby tail. Dark legs and feet stretched and flapped outwards and backwards. No bird was seen which showed any sign of winter plumage. When on the wing they flew low over the water in characteristic auk-fashion in a straight line with rapidly whirring wings, often forming into long trailing lines in the air.

It is noteworthy that Brünnich's Guillemot was certainly identified from March 25th on the Tail of the Bank each day until as late in the voyage as March 28th (noon position $53^{\circ} 38'N$, $30^{\circ} 32'W$.) at a point where the nearest land at Cape Farewell is 600 miles away and Ireland is about the same distance, both being much nearer than the nearest point of Newfoundland. In view of this evidence of far ocean wandering of this species even in spring it seems remarkable that there are so few reliable recorded occurrences of Brünnich's Guillemot in the British Isles (cf. Wagstaffe, Williamson and Broughton, *North-Western Naturalist*, Vol. xxi, p. 20). Other observers do not generally appear to have found Brünnich's Guillemot so far from land although Wynne-Edwards (*loc. cit.*) considers it more strongly pelagic than Common Guillemot or Razorbill. Nicholson (*British Birds*, Vol. xxii, p. 122) found the bird abundant in $37-38^{\circ}W$. in June and again in $48^{\circ}W$., but these observations were made much farther north, less than 200 miles from Cape Farewell. Alexander (*loc. cit.*) found Brünnich's Guillemot in crowds in March at $43^{\circ} 35'N$., $46^{\circ} 08'W$., in the Newfoundland area, but does not note any further east. Wynne-Edwards, however (*loc. cit.*), found a single bird on August 1st at $53^{\circ} 20'N$., $37^{\circ} 45'W$., very nearly as far from land as were the outermost birds that I saw. Rankin and Duffey (*loc. cit.*), in their many crossings, seem to have seen little of the species.

It is surprising that I was able to identify among the hosts in the Newfoundland Banks area no auk other than Brünnich's Guillemot. In this area Alexander (*loc. cit.*) at about the same time found, besides Brünnich's Guillemot, some Common

Guillemots, a Puffin and many Little Auks, and Rankin and Duffey (*loc. cit.*) frequently saw Little Auks. Wynne-Edwards (*loc. cit.*), however, found Common Guillemot and Razorbill scarce away from immediately coastal waters and I was 200 miles from land.

In contrast with the case of Fulmars, the large gathering of Brünnich's Guillemot in Newfoundland waters is ascribable doubtless to the existence of large breeding colonies of this species in Newfoundland (see, e.g., Bent, *Life Histories of North American Diving Birds*).

GREAT SKUA.

This bird was present about the ship discontinuously from about 50°N., 38°W., to about 55°N., 28°W., but in no other area. Thus it was seen only in the central area of the Atlantic midway between Newfoundland and Ireland. At no time were more than three birds present at once. Even when more than one were in sight they flew independently. The birds would usually fly low over the water with leisurely flap and glide, much in Herring-Gull fashion, but for short periods they would soar and circle the ship high up, gliding on steady wing and appearing from below markedly buzzard-like. For long periods they would beat up and down among the Kittiwakes following the ship, occasionally picking a morsel from the water. They glided down, legs and feet outstretched forward, and picked at the surface with the bill, then flapped away upwards without alighting. They did not usually molest the Kittiwakes though one was seen once chasing a bird of this species, apparently without resolution. Frequently they would move away out to sea and ahead, usually in the lee of the ship, sometimes disappearing far over the water but generally reappearing in the vicinity of the ship in a short time. All the birds seen were uniformly dark sepia in colour with a very white and sharply defined roughly triangular patch on the upper surface of the primaries. From below, this patch was less brilliantly white, larger and less clearly demarcated. One of the birds seen had, besides the white patch on the primaries, also a smaller white patch on the upper surface of the wing near the carpal joint.

It may be noted that Wynne-Edwards (*loc. cit.*) on his two earliest (May) crossings found this species (five birds in all) in much the same locality between 25° and 40°W., and nowhere else in oceanic waters, although later in the year he found it scattered over a much wider span of longitude.

HERRING-GULL AND GREAT BLACK-BACKED GULL.

Herring-Gulls were present continuously and Great Black-backed Gulls intermittently about the ship during the first week of the voyage although she was from the first day constantly over 200 miles from land. The last Herring-Gull on the American side was seen about noon on March 26th, at 47° 02'N., 43° 26'W., i.e. nearly 400 miles east of Cape Race. None was seen thereafter

until after noon ($58^{\circ} 28'N.$, $10^{\circ} 10'W.$) on March 31st, when in the immediate vicinity of the Flannan Islands. Seemingly there is a tendency to follow a ship outwards and so to wander into waters not usually inhabited by this species. VENABLES also (*British Birds*, Vol. xxxi, p. 295) observed three Herring-Gulls on a west to east voyage at about $40^{\circ} 22'N.$, $54^{\circ} 56'W.$, i.e. nearly 400 miles from Cape Race in March, but RANKIN and DUFFEY (*loc. cit.*) found them never so far from land.

The intermittent appearance of the Great Black-backed Gull about the ship during the early part of the voyage suggests that this species habitually forages over 200 miles from land in North American waters. WYNNE-EDWARDS (*loc. cit.*) found it seldom more than 40 miles from land, but RANKIN and DUFFEY (*loc. cit.*) made observations similar to mine.

PETRELS AND SHEARWATERS.

It may be well to call attention to the fact that throughout the whole voyage, apart from one of the smaller petrels, possibly Wilson's, no petrels nor shearwaters of any kind were encountered. VENABLES (*loc. cit.*), on March 21st at $42^{\circ} 36'N.$, $42^{\circ} 10'W.$, saw six *Puffinus diomedea* (*kuhlii*), two *Puffinus gravis* and two unidentified shearwaters. This is at a point rather more than 200 miles south-east of M.V. Sacramento's course at its nearest point. However from Wynne-Edwards' summary of his own and other observations my seeing no shearwaters is not surprising. Great Shearwaters are at that time generally too far south and *diomedea* away to the south-east. The apparent absence of the smaller petrels is perhaps more remarkable, but these birds may have been present and escaped observation owing to the bad weather conditions.

GANNET.

Notwithstanding the presence of a gannetry at Cape St. Mary and of others at three places in the Gulf of St. Lawrence no Gannets were seen in American waters. Wynne-Edwards found them numerous south of Newfoundland in May and June. The first Gannets I observed were just west of $10^{\circ}W.$ in Scottish waters and occasional birds were encountered thereafter.

BILL AND LEG COLOURATION OF THE COMMON HERON IN THE BREEDING-SEASON.

BY

ROBERT F. RUTTLEDGE.

SINCE the time when Mrs. Gough made the discovery (*antea*, Vol. xxxviii, pp. 149-150) that there was a tendency for the bill and legs of the Common Heron (*Ardea cinerea*) to undergo a change in colour, she (K.G.), Mrs. Norman Teacher (D.N.T.), J. S. Barlee (J.S.B.), and I have endeavoured to make further study of this matter. I have had the best (though all too limited) opportunities for this study, but although some useful results have been obtained, the picture is still far from complete. While it is now obvious that many Herons assume in the breeding-season an orange or reddish colour on the bill, even in a proportion of cases a vermilion colour, it is not as yet anything like certain in what percentage of birds this occurs or to what degree. It would be essential to carry out intensive observation of a selected pair throughout the breeding-season to obtain data on the "rise and fall" of the colour change of both bill and legs.

I paid several visits to a heronry on an islet in a Connemara lake where nests were almost at ground level. Distance and other considerations made it impossible to carry out as detailed observations as I would have wished. The results, with the essential facts as I see them, are stepping-stones only in research in this subject.

Both K.G. and D.N.T. having a very keen sense of colour, their opinions have been invaluable. Colours referred to are those used in Wilson's Colour Chart 1, published by the British Colour Council. Considerable care was taken in arriving at the colours; the difficulty in matching the bill and legs of a bird when not in the hand must be realized, and since the bills are undoubtedly shaded exact matching with colour charts and through the medium of other objects is nearly impossible.

Vermilion 18/1 in particular was arrived at satisfactorily by comparison with the bill of an Oyster-catcher (*Hæmatopus ostralegus*) in summer plumage seen immediately after viewing the Herons, as well as by comparison with a variety of objects.

The following are results obtained so far:—

February 19th. All of fourteen Herons seen well had bills varying in degree and extent of orange colouring. Two seen displaying had markedly orange bills. No trace of pink was seen on any bill. (R.F.R.).

March 9th. One bill showed more red than orange, another orange-red. Thirteen other bills varied from practically normal* to deep orange. (K.G. and D.N.T.).

* Normal and abnormal are used with reference to the bill and leg colour as given for adults in *The Handbook*, Vol. iii, p. 133, which colour for purposes of this paper is considered normal.

March 22nd. Several birds with azalea-pink to geranium-lake bills. Two males had vermilion 18/1 bills. These indulged in frequent display and coition took place. In display the underside of the upward-pointed bills showed vermilion 18/1 for about half their length from the base.

The bills of the females of the above males were, in one orange tending to azalea-pink, in the other slightly orange. Two others were azalea-pink 618/1; three varied from orange to pinkish. (D.N.T. and R.F.R.).

There was therefore a tendency for the intensity of pink to have increased since March 9th and in two cases to have reached vermilion.

The pink of all legs seen was more noticeable and deeper than on March 9th. (D.N.T.).

April 3rd. A male with bill vermilion 18/1 shading to orange at the tip only, was considered nearly as highly coloured as the Raford bird (*antea*, Vol. xxxviii, pp. 149-150). (K.G.).

The female of this pair had the bill azalea-pink 618/1, the difference between the two being very noticeable during "bill-crossing". (K.G. and R.F.R.).

On this date several birds, both male and female, the bill colouring of which had been particularly noted on March 22nd, showed definite signs that the high colour was receding. Five other birds showed considerable variation from an incubating bird with carmine-rose 621/3 bill to orange or slightly orange in three and one (incubating) normal bill.

April 21st. A tendency for less brilliant colouring in the most highly coloured bills than was the case on the two previous visits. (R.F.R.).

When J.S.B. and I visited the heronry from April 15th-18th, 1945, we found (using binoculars* only) that a number of birds had normal coloured bills, others had orange or pink bills according to change of position of the head. The bills of the only birds seen displaying then were either near geranium-lake 20/3 or orange. We saw no bill with any sign of vermilion. In that year the birds had well grown young in their nests, whereas in 1948 (due to some unknown agency) nesting had been delayed and birds were still incubating on April 21st.

There is no doubt that even the most highly coloured bills are subject to shading, the more intense colour being at the base of the upper mandible. In the earlier stages at any rate there would appear to be variation in apparent colour according to light and position of the bird's head and this is applicable also in the period of decline in colour.

* Binoculars have a tendency to show bills normal or nearly so when, in actual fact, the colour is noticeably orange as shown by the telescope. The latter shows the bills more constant in colour. Hence on this occasion the birds noted as having normal bills may well have had some remnant of orange.

There is not the slightest doubt that a proportion of birds attain a vermilion bill and that the majority of bills become azalea-pink, certainly orange, in the breeding-season.

Legs are not infrequently pink or pinkish where the bill is normal, but it is exceptional to see a bird with normal coloured legs when the bill has become pink or orange.

It would seem that the male attains a greater degree of high colouring in the bill than does the female and this was evident in Mrs. Gough's record (*loc. cit.*).

My chief object was to obtain data on the increase and decline in intensity of bill and leg colouring. With this in view two pairs of Herons were selected. Unexplained interference with the nesting birds prevented stable conditions for breeding in early March and it was not until March 22nd that I selected the pairs. They will be referred to as No. 1 male, No. 1 female, No. 2 male and No. 2 female. As far as is possible a comparison of the bill and leg colour on each visit is given.

No. 1 male. March 22nd. Bill vermilion 18/1. Legs azalea-pink 613/1. Display frequent. Coition witnessed.

April 3rd. Bill, basal quarter at times as vermilion as on March 22nd, but more often carmine-rose 621/1 at the base of both mandibles including the inside of the nostrils, shading to orange at tip. Therefore vermilion area had decreased since March 22nd. Legs not seen. Bird incubating. So clearly seen that it was possible to say that there was no abnormal colouring of the iris.

April 21st. Bill geranium-lake, thus considerably less brilliant than on April 3rd. Legs markedly azalea-pink 618/1. Bird standing on nest beside incubating female.

No. 1 female. March 22nd. Bill orange with tendency to azalea-pink. Legs not seen. Display frequent. Coition witnessed.

April 3rd. Bill deep orange with trace of azalea-pink 618/1 on culmen at base. A diminution of pinkness since March 22nd. Legs carmine-rose 621/1. Relieved incubating male.

April 21st. Bill orange, at times showing azalea-pink 618/1 at base. Legs pinkish from tarsal joint downwards.

No. 2 male. March 22nd. Bill vermilion 18/1 for c. $\frac{1}{4}$ length shading through azalea-pink 618/1 to an orange tip. Edges of mandibles orange throughout. Legs azalea-pink 618/1. Display and coition took place.

April 3rd. A bird was incubating. No change-over seen. Bill azalea-pink 621/2, thus probably No. 2 male.

April 21st. Again no change seen. Bill orange with slight trace of pink. If, as seems probable, the bird on April 3rd and 21st was the male, the bill colour had on each occasion diminished in intensity.

No. 2 female. March 22nd. Bill also normal with slight orange tinge. Legs not seen.

April 3rd. }

April 21st. } See under No. 2 male.

In addition a bird (No. 3) standing on its nest throughout our visit on March 22nd had a vermilion 18/1 bill. Legs geranium-lake 20/3.

April 3rd. Not seen.

April 21st. Pair at nest. Colouring as below.

Probable male. Bill vermilion 18/1 shading from half length to orange. Legs geranium-lake 20/3.

Probable female. Bill azalea-pink 618/1 at times; orange at times and at times basal third pink, remainder orange. Legs near crimson 22/3.

Whichever the sex of the bird at the nest on March 22nd there was less vermilion on the bill by April 21st.

It seems evident that the change from normal is fairly gradual and that the decline from high colour to normal is also gradual.

On February 19th a change from normal was evident in all birds seen, but there was no trace of pink visible on that date. By March 9th there had been considerable development in several individuals, which had attained a reddish tinge. By March 22nd development to vermilion had taken place in several cases and azalea-pink was fairly general. (It is unfortunate that the selected pairs had reached high colouring before conditions allowed of watching the change from normal.)

On April 3rd it was evident that some of the previously highly-coloured bills were showing signs of the high colour receding.

By April 21st the high colours had further receded, though even on that date traces of vermilion existed in some individuals.

The bill may maintain a certain amount of vermilion over a period of at least 30 days. For how long the state of complete vermilion remains is not yet proved.

Azalea-pink or partly azalea-pink bills are maintained for a considerable period.

That this change in colour of the bill and legs is not confined to birds in Co. Galway is proved by observations in Counties Mayo (where it is widespread), Cavan and Clare.

I have to thank Mr. B. W. Tucker for his advice and suggestions on the lines of investigation.

REMARKS ON A SEASONAL COLOUR CHANGE IN THE BILL AND LEGS OF HERONS.

BY

B. W. TUCKER.

THE following short paper is to be taken as complementary to that of Major R. F. Ruttledge which immediately precedes it and should also be read in conjunction with one by Mrs. K. Gough entitled "Some Observations on a remarkably coloured Heron" which was published in *British Birds*, Vol. xxxviii, pp. 149-150.

In view of Major Ruttledge's interesting observations the occasion seems appropriate for summarizing briefly the information received by *British Birds* as a result of our request in Vol. xxxix, p. 128, following the publication of Mrs. Gough's paper, and repeated in Vol. xl, p. 94. This information is for the most part fragmentary, but is sufficient to establish that a tendency to develop a reddish or pinkish colouring of bill and legs in the breeding-season is at least not uncommon in the Heron. The records are given in order of date and there are added for convenience three others by Mr. Ronald M. Garnett which have been published in *British Birds* already (Vol. xxxviii, p. 280). Two or three of them are of somewhat doubtful significance, since the appearance may have been influenced by tricks of light, but a number are quite unequivocal and it has seemed worth while to quote all the reports we have received.

December 30th, 1945. In the case of a bird observed in a field at Englefield Green, Surrey, it was noted that "the legs looked red in the sun". (D. J. May).

December 30th, 1943. A bird fishing in the Deveron (Aberdeen-Banffshire border) had bright red legs. The day was dull and cloudy, so that the light conditions were good for accurate observation of colour. (Adam Watson).

March, 1937. A brooding bird at Holkham Park heronry, Norfolk, had a salmon-pink bill. (R. M. Garnett, l.c.).

March 16th, 1946. A bird observed at a pond near Powburn, Northumberland, had a bright red bill; colour of legs not seen. (Mrs. W. E. Oliver).

March 23rd, 1946. A bird observed on the ground at the heronry in Wanstead Park, Essex, had the bill almost flesh-coloured. The legs appeared more or less green-grey. Viewed at about 40-50 yards with 10x40 binoculars in excellent light. (F. C. Bromley).

March 23rd, 1945. One observed at approximately 30 yards range with 8x binoculars at Giza, Egypt, had distinct flesh-coloured legs and bill, contrasting with the normal yellowish-brown legs and bill of another bird accompanying it. (C. A. White).

March 24th, 1947. One seen perching on a pine by the River Leven, the affluent of Windermere, about halfway between Newby Bridge and Backbarrow, had the bill and legs a strong flesh-pink. Observed in clear sunlight. (A. V. Millard).

March 26th, 1939. A bird seen in Castle Howard Park, N. Riding, Yorkshire, had a salmon-pink bill. There is no heronry in this locality. (R. M. Garnett, l.c.).

March 26th, 1946. An adult on the shore of the Exe Estuary had the legs pure pink and a good deal of the same colour on the sides of the bill. (A. Holte Macpherson).

March 27th, 1948. The bills of three birds at the Crichel Park heronry, Dorset, were decidedly pink; leg colour not made out. (J. Voysey per Dr. K. B. Rooke).

April 10th, 1947. One with bright pink legs and bill pinkish-orange seen on the Exe Estuary, about a mile from where one, possibly the same bird, was seen in March, 1946. (A. Holte Macpherson).

April 10th, 1947. One seen by the river at Avon Bridge, near Christchurch, Hants, showed obvious red colouring on the bill. Well seen with binoculars in good light at about 100 yards range. (A. E. Hidden).

Mid-April, 1946. A bird observed at the water's edge near a small heronry at Nuneham Courtenay, Oxon, had a rather striking flame-coloured margin to upper and lower mandibles and definitely pinkish feet. (R. Barrington).

Mid-April, 1945. One observed on the Trent near Thrumpton, Notts, had definitely pink legs, but the bill appeared of the normal yellow. (M. Romer).

April 14th, 1946. A bird flying in to heronry at East Stoke, Notts, carrying a stick, had bright orange-red bill. Two other normal birds were standing close to it in the tree in which it settled and it was thus possible to make sure that the appearance was not due to any trick of light. The bills of three other birds were noted to have a slight tendency to pale pink. In no case could the colour of the legs be accurately established.

It may be noted that the main heronry trees of the previous year had been cut down, so that the birds had been obliged to build new nests; it might be expected that this would tend to make them late in breeding. Most of the other nests in the heronry contained young, but none could be seen in the nest of the bird in question, so that it probably had eggs. (K. J. Raines and J. Staton).

April 18th, 1947. A bird occupying a nest at Town Pond, Godstone, Surrey, and evidently incubating eggs had at least three-quarters of the bill a very deep red. Leg colour not ascertained. (L. I. Carrington and H. Bentham).

April 18th, 1948. One at the Crichel Park heronry, Dorset, had distinctly pink bill; leg colour not noted and other birds not in a favourable position for comparison. (Rev. G. W. H. Moule and Dr. K. B. Rooke).

April 24th, 1941. A brooding bird at the Scampston Park heronry, E. Riding, Yorkshire, had a salmon-pink bill. (R. M. Garnett, l.c.).

May 1st, 1932. A bird incubating at the Buscot heronry, near Faringdon, Berks, had the bill a very soft flesh-pink with the faintest tinge of yellow to orange in it. (G. K. Yeates).

May 9th, 1948. A bird at the Crichel Park heronry reported by a member of Bryanston School Natural History Society (*per* A. J. Bull) had a bill described as pink.

May 17th, 1946. One seen at Hamper Mill Gravel Pits, Moor Park, Herts, had the bill a definite salmon-pink and legs yellow. Observed with 8x binoculars at about 75 yards range. (A. J. Bruce).

These observations may be summarized as follows:—

Legs described as red (and one of these seen under favourable conditions) are recorded in only two cases and both of these at the end of December. Pink or flesh-coloured legs are recorded from the fourth week of March to at least mid-April, but there are no records of leg colour after this date until mid-May, when a bird with a pink bill had the legs yellow. There are records of birds with bills pink (or largely pink) to reddish from the fourth week of March (9), through April (6) to the first half of May (3—latest date May 17th). Only two cases of strongly red bills, presumably resembling the original case described by Mrs. Gough, are recorded, one in mid-March and one in the third week of April, but to these must be added one of a bird seen near Fawdon, Northumberland, on March 16th, 1946, which had a bright red bill, "quite as bright a red as that of an Oyster-catcher", recorded in the Ornithological Report for Northumberland and Durham, 1946 (*Naturalist*, 1947, p. 123).

Generalization from such limited and fragmentary data can only be very tentative. It can, however, be said that even in the absence of other observations they would indicate that the assumption of a more or less strongly pink colour of bill and legs during the breeding-season is evidently not very uncommon and that birds so coloured may be observed throughout the greater part of the breeding-season. These conclusions are consistent with those drawn from Major Ruttledge's systematic observations at a single colony, though these latter showed that at the colony in question the development of a more or less strong pink colouring was in fact fairly general and that although it reached its maximum intensity for most birds about the third to fourth week of March the beginnings of the change were observable considerably earlier.

It might be assumed that the red colour reported in a few birds in both Ireland and Britain represents an exaggeration of the commoner pink in a few aberrant individuals, and indeed Major Ruttledge's observations seem hardly to allow of any other interpretation, but I am indebted to Mr. Fr. Haverschmidt for drawing my attention to a most interesting observation in a popular Dutch book on birds which suggests, that it is normal for a quite short time.

The work in question is *Uit Neerlands Vogelleven* (1941) by the late Nol Binsbergen, a well-known Dutch bird-photographer. I am indebted to Dr. G. A. Brouwer for most kindly extracting the relevant passage for me from the section on the Heron. The author describes a heronry in the Polder Beemster, north-west of Amsterdam. Most of the nests are in elms surrounding an orchard, but in the season referred to several pairs built their nests in the apple trees, rather low down. As the farmer did not like the nests in his fruit trees he took the eggs and threw out the nests, but after a few days most of these nests were re-built in the same place.

The account (translated: *italics mine*) proceeds (p. 18) as follows:—

"We noticed from the beginning that the birds which had just paired or not yet paired, were much handsomer than the ones that had been breeding for some time. With the former birds the decorative feathers on the breast and the back were magnificent; and in the *blood-red colour of the eyes and bill* they differed strikingly from the birds not in full plumage and those that had been breeding for some time, in which these were yellow.

The bill and eyes of the Herons whose nests had been destroyed became red again when they paired anew. For hours they stood by the fork where the nest had been, occupied in cleaning themselves; again and again they passed the decorative feathers through the bill-tips until they became shining and pointed; they shivered to get rid of the dirt between the feathers and continually rubbed the bill against the branches, which made the base of the bill red-coloured. This ceremony is also preliminary to the so-called snapping ceremony, in the early spring during the first pairing. . . . We saw that each couple stayed together and as a rule built the new home at the place where the old one had been thrown out."

Several points in Heer Binsbergen's account call for comment. In the first place, assuming it to be essentially reliable (which



NORTHERN LONG-TAILED TIT (*Aegithalos c. caudatus*) AT NEST, SKAPA, SWEDEN, MAY, 1946.

(Photographed by Olof Swanberg).

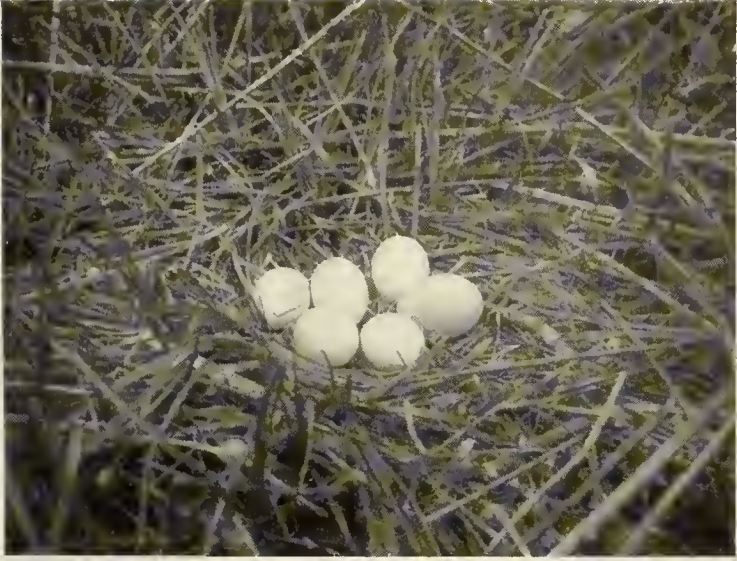


TWO REMARKABLE FLIGHT ACTION PHOTOGRAPHS.

UPPER.—ARCTIC SKUA CHASING ARCTIC TERN.

LOWER.—ARCTIC TERN IN THE ACT OF DIVING.

(Photographed by Arthur Christiansen).



UPPER.—NEST OF MARSH-HARRIER CONTAINING FIVE EGGS OF THE HARRIER AND ONE OF A PURPLE HERON, FRIESLAND, HOLLAND, MAY 17TH, 1942.

LOWER.—NEST OF PURPLE HERON WITH EIGHT EGGS IN ALDER, FRIESLAND, MAY 21ST, 1944.

(Photographed by Fr. Haverschmidt).



UPPER.—OYSTER-CATCHER TRYING TO ESCAPE THROUGH WIRE FENCE (see note on p. 53).

(Photographed by Fr. Haverschmidt).

LOWER.—OYSTER-CATCHER'S NEST WITH FIVE EGGS, SAMSON, ISLES OF SCILLY, MAY, 17TH, 1948 (see p.63).

(Photographed by J. A. B. Gale).

there seems no reason to doubt as it is based on daily observations at close range from a hide), the red colour would appear to be (a) regular, (b) of quite brief duration, and (c) very precisely correlated with a particular (early) stage of the reproductive cycle. The redevelopment of the colour in birds obliged to return to the beginning of the cycle by the destruction of their eggs and nests is most noteworthy if it can be confirmed. Unfortunately the observations are tantalizingly incomplete. We do not know how many pairs were involved, nor how long after the beginning of incubation the eggs were destroyed; more precise evidence on the latter point would afford some indication of how long the red colour took to fade, but presumably it must have done so rather rapidly, since it is unlikely that the birds were left undisturbed in the apple trees for very long. We do not even know whether it was established with certainty that the individuals described as re-developing the red colour really had fully red bills when breeding began, although the implication is that this is so. Nor is any light thrown on the range of individual variation. In fact it can only be said that although the observations are most suggestive and interesting they need repeating with greater exactitude. It should not be overlooked that Heer Binsbergen's conclusions do not seem to square with Mrs. Gough's experience, since the bird described by her had a scarlet-red bill on March 26th, when its mate's bill was yellow tinged with pink, and still had the bill orange-red, i.e., only slightly faded from the bright red of March, as late as June 21st. They are equally at variance with the observations of Major Ruttledge, which show quite definitely that, in the Irish colony at any rate, both the development and the fading of the bright colouring were gradual and that while the majority of bills became pink or at least orange only a very small proportion of them became strongly red. It seems clear that the Irish and Dutch observations cannot be completely reconciled, and since Major Ruttledge's observations were clearly carried out in a most careful and scientific manner, while Heer Binsbergen's were incidental to photography and probably more dependent on general impressions than on close following of the history of particular individuals, it seems possible that the latter's account is somewhat less critical. It is conceivable that there may be local genetical variations in the frequency and intensity of the red colouring, but the account of its rapid fading in the Dutch birds is puzzling and clearly further study is needed.

A second point to be noticed is the development of a red eye. This has not been recorded in any of the recent British observations, but unless the conditions were exceptionally favourable it would probably not be clearly seen except from a hide. Lastly there is the curious suggestion that the base of the bill becomes reddened as a result of rubbing against the branches. Seeing that apparently the whole bill becomes red it is not clear why rubbing against branches should be thought to be responsible for reddening

of the base; in any case the suggestion seems improbable and perhaps need not be taken very seriously.

I am indebted to Mr. G. C. S. Ingram for drawing my attention to an interesting note which appeared in the *Zoologist*, 1904, p. 70, in a paper by the late Prof. J. H. Salter entitled "Ornithological Notes from Mid-Wales". This note quotes Mr. F. T. Feilden, of Borth, as writing to the author:—

"On February 27th [1903] I killed the finest old Heron I ever saw, and as the colour of the legs and bill was very remarkable, I made notes of them before the bird was dead. Bill from base crimson, blending into orange-vermilion, Indian yellow, and aureolin at tip. Eye, scarlet outer circle (iris), straw inside. Legs, upper-part vermilion, lower yellow spotted with vermilion."

This careful description represents the earliest reference to the phenomenon under discussion that has so far come to my notice. One cannot but wonder that it has been so generally overlooked for so long. Several factors in conjunction have probably been responsible for this, namely its transitory character, the fact that Herons tend to nest high up in situations where close observation is not very easy, and the (very proper) disinclination of most collectors in recent years to shoot birds actually nesting. It will be apparent that much remains to be learnt about these seasonal colour changes, their frequency, duration, variation in intensity, relation to a particular phase of reproductive activity, and so on. Major Ruttledge has made a valuable beginning, but I know that he would support me in commending the subject to the attention of any other observers with access to a heronry where observation at close range is possible and with the leisure to make an intensive study. It is incumbent on British ornithologists to fill this unexpected gap in our knowledge of a quite common bird.

In conclusion it will not be inapposite to notice that attention has been drawn in recent years to comparable seasonal changes in the colouring of the soft parts of several other species of heron during the breeding-season. In *British Birds*, Vol. xxx, pp. 70-73, I myself gave an account of striking changes of this kind in the Buff-backed Heron (*Ardeola ibis*), which are rather closely analogous to (though more general than) those now recorded in the Common Heron, since they entail a reddening of bill, eyes and legs. It has also been comparatively recently recognized that in the Night-Heron (*Nycticorax nycticorax*) the normally yellowish legs of some individuals assume a bright pink colour in the breeding-season (see especially *Orn. Monatsberichte*, 1934, pp. 89, 173-4). But in comparison with the Common Heron few ornithologists have opportunities of studying these species and gaps in knowledge about them are more easily understandable and more excusable than in the case of so widespread and common a species as *Ardea cinerea*.

STUDIES OF SOME SPECIES RARELY PHOTOGRAPHED.

XVII. THE NORTHERN LONG-TAILED TIT.

Photographed by
OLOF SWANBERG.

(Plate 11).

INTERPRETING the title of this series, as we have done on several previous occasions, as covering well-marked subspecies as well as species in the strict sense, we now publish an admirable photograph by Mr. Swanberg of the extremely well-marked Northern or White-headed form of the Long-tailed Tit (*Ægithalos caudatus caudatus*), which is on the British List as a very rare vagrant. It may be recalled that an example was identified in Sussex on January 22nd, 1948, (*antea*, Vol. xli, p. 308).

This race has a very wide range in Northern and Eastern Europe and in Northern Asia, while it is of interest that the so-called Central European race, *Æ. c. europæus*, shows a more or less extensive admixture of white-headed individuals. The latter form in fact exhibits a great range of variation, from examples with dark head-markings, as in the British race, to ones with pure white heads indistinguishable from true *Æ. c. caudatus*, the white-headed birds being commonest in the eastern populations.

Mr. Swanberg's photograph shows a bird feeding young at a nest in the fork of a birch tree near Skara, Middle Sweden, at the end of May, 1946.

B.W.T.

TWO REMARKABLE FLIGHT ACTION PICTURES.

(Plate 12).

WE are glad to publish two remarkable photographs by Mr. Arthur Christiansen, of Denmark, showing an Arctic Skua (*Stercorarius parasiticus*) chasing an Arctic Tern (*Sterna macrura*) and an Arctic Tern in the act of diving. The latter brings out a point which is new to us, namely that a diving tern—sometimes at any rate—carries its legs bent forwards instead of extended backwards, perhaps in order to give added impetus by a backward kick after submerging.

B.W.T.

NOTES.

RUBBER IN CASTINGS OF ROOKS AND JACKDAWS.

On January 31st, 1947, I visited a winter roost of Rooks (*Corvus frugilegus*) and Jackdaws (*Corvus monedula*) close to the junction of the rivers Ver and Colne near Radlett, Herts. I estimate that 500-800 birds were using this roost during the winter 1947-48. It consisted of two stretches of woodland adjacent to each other, one deciduous and one coniferous.

I examined the pine needle floor of the coniferous section and found it covered with large quantities of castings or pellets and faeces. In the pellets were considerable numbers of small pieces of rubber of different colours, shapes and sizes. This was general all over the floor of the wood, which I searched carefully. The predominant colour of the rubber was brick-red, followed by white, pink, blue, green and scarlet together, in that order of frequency. It may be significant that the predominant colour of small stones found in the pellets was also brick-red. Some were tubular, some sheet, some rectangular and some the insulation of wire (but I did not discover any wire in it). There was also a quantity of very thin sheet rubber roughly two inches square, partly decomposed owing to its weakness. Size and volume varied from fragments as big as the head of a nail to strips $1\frac{1}{2}'' \times \frac{1}{2}'' \times \frac{1}{8}''$. Owing to rain and exposure many of the pellets had dissolved and the rubber lay free on top of the pine needles in a mixture of faeces and debris of disintegrated pellets. The amount of free rubber found varied according to the intensity of the droppings, which, added to the fact that it is unlikely that such a material would be found in a pinewood thirty years old, proves that it had been deposited there by the agency of these birds.

M. G. RIDPATH.

The curious predilection of Rooks and Crows for rubber objects is evidently widespread. It has been noted in a number of localities in Germany and so far as I know was first recorded by Fr. Lindner in the *Ornithologische Monatsberichte*, 1914, p. 96. It was reported again in 1933 by K. Bäseeke (*l.c.*, 1923, pp. 50, 120), who recorded quantities of rubber objects in the pellets under a rookery in the district of Wolfenbüttel and under a winter roost of crows, consisting of at least 50% Hooded Crows (*C. cornix*), near the same town, and H. Ringleben (p. 87), who stated that he had observed the same habit at winter Rook-roosts in several parts of Germany (Thuringia, Goldene Aue, Hanover). Subsequently (*l.c.*, 1935, p. 148) Bäseeke reported the results of a careful investigation of a great number of pellets obtained at regular intervals from roosts near Brunswick, consisting of about two-thirds Hoodies and the rest Rooks and Jackdaws. At one roost occupied by birds feeding mainly on the town rubbish dumps a great variety of rubber objects from household and other sources was found in no less than 666 pellets out of 6,648 examined. It is

suggested that the soft and flexible consistency of the rubber leads the birds to mistake it for something edible. Our correspondent's experience of finding small brick-red stones frequently in the pellets is curiously parallel with that of Båsecke and Ringleben, who both found small bits of red brick common; but a previous impression that the birds showed a preference for red rubber was dispelled by the former's detailed investigation just referred to.

The only comparable case known to me in this country was recorded by the late Miss Hibbert-Ware in *British Birds*, Vol. xxiv, p. 27, with reference to a rookery in Wanstead Park, where the habit is of long standing. Miss Hibbert-Ware stated that the articles were not found in connexion with pellets, but in view of the other observations there can be little doubt that they came from disintegrated pellets.

In *British Birds*, Vol. xxx, p. 374, is a note by Messrs. Ingram and Salmon recording the taking of rubber objects by Starlings, gulls and even Arctic Terns. In the case of the Starlings quantities of rubber bands were found under a roost, thus paralleling the present examples in the Corvidæ.

B. W. TUCKER.

INCUBATION OF TAME JAY.

As *The Handbook* mentions that confirmation is desirable of the statement that both sexes of the Jay (*Garrulus glandarius*) incubate, the behaviour of a tame pair that have nested this year [i.e., 1948.—EDS.] in a large aviary seems worth recording.

The female laid her first egg between 7 and 7.40 a.m. on April 21st, 1948, the other four following at daily intervals. She commenced sitting on the nest at dawn on the 21st, although I think actual incubation did not commence until the third egg had been laid. Incubation was entirely by the female, who was fed on the nest by the male, coming off several times daily for periods of from one to seven minutes. The need for exercise, water and defecation seemed to be the main reasons for leaving the nest, although whilst off she was invariably fed by the male—at least on those occasions on which she was observed—and often took food for herself.

There has been nothing in the birds' behaviour to suggest that the male acted abnormally or that the nesting-cycle was in any way defective. Both sexes have been—and at the moment of writing still are—most attentive to the young, but here again the brooding of them has been undertaken only by the female.

DEREK GOODWIN.

GOLDEN ORIOLE IN HAMPSHIRE IN DECEMBER.

ON December 1st, 1947, in a small clearing in the woods at Highclere, north Hampshire, I observed on the ground a single brilliantly yellow bird, which appeared about the size of a Song-Thrush (*Turdus ericetorum*). It flew away into the trees almost immediately and was not seen again, but the following characters

were clearly noted—black wings and, in flight, black tail edged with yellow, the black forming a wedge shape; the rest of the plumage was a striking yellow. The head was not clearly seen, but I feel that there is no doubt that the bird was a male Golden Oriole (*Oriolus oriolus*). C. M. SUMMERS-SMITH.

[The Golden Oriole winters in tropical and South Africa. We know of no authenticated winter occurrences on the Continent and Mr. Witherby in *The Handbook* admitted none in the British Isles. There are, however, two January records for Sussex, which are mentioned by Mr. Walpole-Bond (*Birds of Sussex*, Vol. 1, p. 62). Both are of males and, as one at least was seen by an observer who knew the species, it is difficult to see how a mistake could have been made. It is, however, suggested that the birds might have been "escapes" and this is, of course, possible, though it does not seem particularly likely, and the same could be said of the present case, in which the identification at any rate cannot be doubted.—EDS.]

CLOSE NESTING OF HAWFINCHES IN DEVON.

As *The Handbook* states that the Hawfinch (*Coccothraustes coccothraustes*) is a rare breeder in Devon it may be of interest to record the nesting of two pairs within seventy yards of each other in that county. One nest was thirty feet or more above the ground in an elm tree and the other in an apple tree, about nine feet above the ground. Incubation was in progress at both nests when I found them. Unfortunately they were near houses and, not wishing to draw attention to the birds, I was only occasionally able to watch behaviour. In the case of the apple tree pair the female left her nest to receive food from her mate, flying to a row of tall elms several yards away. This behaviour appeared to continue practically right up to hatching time. At the elm tree nest, however, the female, which at first left the nest and went a few feet above it to receive food, apparently took to remaining on the nest to be fed before the young were hatched. For the first few days after the hatching of the young the nature of the food brought to them by both pairs of adults could not be seen, but the birds' beaks were seen to be slightly open. Later green caterpillars were brought. These could be seen dangling out at the sides of the birds' large beaks. Both broods of young left the nests on the same day, May 22nd, 1948. R. G. ADAMS.

UNUSUAL SONG OF GOLDFINCH.

At Lamorna, West Cornwall, on May 26th, 1948, my attention was drawn to a song very similar in style and pattern, including the terminal flourish, to that of a Chaffinch (*Fringilla cœlebs*). The only noticeable differences were that the song was more metallic in character, and the terminal flourish was thinner, than is normally the case in the song of the Chaffinch. Eventually I found the singer and saw that it was a Goldfinch (*Carduelis*

carduelis). The bird, singing from the top of a tree, repeated this Chaffinch-like song time after time. I am very familiar with the Goldfinch and its song, and have never before heard it uttering a song so much like that of the Chaffinch. J. E. BECKERLEGGE.

ALTERNATIVE CALL OF CHAFFINCH.

REFERRING to my note "Alternative Call of Chaffinch" (*antea*, Vol. xl, p. 248) it may be of interest to record that I heard a cock Chaffinch (*Fringilla cœlebs*) making this same "tswee-e-e" call at 9.30 a.m. on April 19th, 1948, at Denton, near Grantham, Lincolnshire, within a few yards of the spot where I heard it on June 15th, 1947. On this occasion, however, the bird was not alternately making the more usual "chwink, chwink", but only the "tswee-e-e" note, and in consequence it was even more ventriloquial than in 1947. I could not locate the bird. Returning at 4.30 p.m., however, I again heard the "tswee-e-e" note repeated many times, and discovered the Chaffinch, with the hen, high up on the branch of a larch. At 7.15 p.m. I heard it again, when I searched in vain for signs of a nest. I may be correct in assuming that the Chaffinch is the same bird I heard at the same spot last year, as all the other cock Chaffinches along this conifer-lined lane and in two neighbouring conifer plantations were using the "chwink" note only and singing their normal song. The fact that I heard the alternative call two months earlier may have been due to the much earlier spring and the warm sunny weather. P. P. L. STEVENSON.

LAPLAND BUNTING IN PEMBROKESHIRE.

ON May 10th, 1948, a male Lapland Bunting (*Calcarius lapponicus*) in almost complete breeding plumage was observed at 0700 B.S.T. by R.F. on Skokholm Island, Pembrokeshire. It was seen on four further occasions, the longest period of observation being about 15 minutes at about 10 yards' range, when twelve observers watched it under perfect conditions. It was last seen at c. 1600 B.S.T.

The following is a description of the bird:—Forehead and crown blackish. A conspicuous eyestripe was dull white, turning downwards behind the ear-coverts and forward again to sides of breast, forming an S-shaped band, but separated from the white of flanks by a black band across the lower breast. Lores, chin, throat and breast black. Ear-coverts dull white framed with a black line. Nape bright chestnut-red. Beak yellow tipped dark horn. Flanks, under-parts and under tail-coverts dull white; the former slightly streaked darker. Mantle and scapulars warm brown, each feather with a triangular dark centre. Two noticeable light parallel lines down mantle apparently formed by warm brown edges of the feathers. Median wing-coverts very dark with lighter fringes. Secondary coverts and secondaries dark brown with outer webs fringed warm reddish-brown with lighter

tips. Rump and upper tail-coverts warm brown, streaked darker. Tail-feathers dark brown fringed with warm brown; outer pairs with whitish outer web. Legs blackish or very dark brown.

It was feeding on rough pasture and short, damp, rabbit-grazed turf. It walked, hopped and ran, but chiefly walked, with a nodding head, and body held horizontally. The wings occasionally drooped and at one period quivered twice. Flight was typically bunting-like and the white collar was conspicuous. In flight it called, a hard, unmusical "tchuc tchuc", rather linnet-like. Song, probably sub-song, heard on four occasions, was unexpectedly sweet. It was recorded as "rather like the Whitethroat's (*Sylvia communis*) song" (R.A.R.), and as "rambling, sweet and harsh notes, with no set refrain, and not very loud . . . at times rather linnet-like, then reminiscent of a Willow-Warbler (*Phylloscopus trochilus*), particularly the descending trill" (P.J.C.).

This appears to be the second record for Wales, two immature birds being recorded in September, 1936, on Skokholm.

P. J. CONDER, R. FOLKARD, J. KEIGHLEY, R. A. RICHARDSON.

NUTHATCHES "HAWKING" INSECTS.

As *The Handbook* makes no mention of the Nuthatch (*Sitta europæa*) "hawking" insects, the following note may be of interest.

On June 9th, 1948, at Dawlish, S. Devon, in company with Mr. H. J. Craske, I was watching a family of Nuthatches in a beech tree. Presently the pair followed by five young ones flew into a partially dead holly tree. Almost at once two of the birds, presumably the adults, flew out from the bare top of the tree, "hawking" some kind of insect. This happened four times in succession.

The party then moved on to another tree, and a little later we saw one of the birds with a white butterfly in its beak. But whether this was also caught on the wing, or picked off a leaf, it was not possible to say. A. V. CORNISH.

[An observation of similar behaviour was published in *Brit. Birds*, Vol. xxxvi, p. 94, but it appears to be quite unusual.—Eds.]

NUTHATCHES WALLING UP ABANDONED NESTING-HOLE.

IN April, 1947, a pair of Nuthatches (*Sitta europæa*) frequented a couple of ancient oaks in my farmyard which contained many possible nesting-sites, one of which had been successfully occupied by a pair in 1946.

By the first week in May I observed that a hole had been selected. It was a horizontal branch with a hollow 7 inches in diameter and 24 inches in length 20 feet above the ground. Both birds were seen gathering mud and cowdung and I assumed all was well. Later in the month I became aware first that the

male's song had ceased and then that the pair was missing. On inspection I found that the hole had been entirely blocked about 4 inches from the entrance and that a Spotted Flycatcher (*Muscicapa striata*) had commenced to build in the remaining space. When the resulting brood departed I broke through the Nuthatch wall with the aid of a hammer and chisel and found it 3 inches thick round the edges and 2 inches thick in its thinnest part. Inside were a few pieces of decayed wood but no eggs.

L. G. WELLER.

WOODCHAT SHRIKE IN PEMBROKESHIRE.

ON June 12th, 1948, a male Woodchat Shrike (*Lanius s. senator*) was trapped and ringed on the island of Skokholm, Pembrokeshire. It was in summer plumage, and the inner tail feathers, primaries, secondaries and wing-coverts had lost most of their white tips.

It was first seen among the bushes in the garden at 15.30 G.M.T. and during the five days it was on the island it stayed in the vicinity of the garden, usually perching on the wire-netting roof of the trap, on the wall, or on the rock outcrop not many yards away. It was last seen at about 18.00 G.M.T. on June 17th.

This appears to be the fourth record for Wales, the others being: one, Pembroke, May 4th, 1923; one, Anglesey, June 6th, 1928 (*Handbook Brit. Birds*), and one near Swansea, Glamorgan, May 22nd, 1947 (*antea*, Vol. xl, p. 275).

P. J. CONDER and J. KEIGHLEY.

PROBABLE BREEDING OF PIED FLYCATCHER IN CHESHIRE.

T. A. Coward in *Fauna of Cheshire* (1910) says "the Pied Flycatcher has been occasionally observed in Cheshire, but only as a passing migrant and, with one exception, all the instances, when the time of year is known, have been during the vernal migration". *Annual Reports of the Lancashire and Cheshire Fauna Committee* (1914-1942) refer only to passage birds in spring. Mr. A. W. Boyd tells me he knows of no breeding records for the years 1943-1947.

On June 20th, 1948, walking along the edge of a beech wood in north-east Cheshire, my wife and myself saw a male Pied Flycatcher (*Muscicapa hypoleuca*). The bird was dividing its time between the ground, a wire fence and a tall beech tree. Young birds were present in the beech tree and we had a momentary glimpse of a dull-plumaged bird passing food to one of three young. Owing to failing light and the proximity of adult and young Chaffinches (*Fringilla cælebs*) it could not be concluded definitely that female and young Pied Flycatchers had been seen.

On the following evening both male and female birds were located about 300 yards from the scene of the first occurrence, but still on the edge of the beech wood. This time, both birds were seen on the ground, clinging to beech trunks 2-3 feet above

ground and on low perches in a small oak. They made frequent excursions high into the beeches, but no evidence of nesting or feeding young was obtained.

Again on June 22nd, male and female birds were seen in the same locality and after watching them for some time a brief view was obtained of the hen feeding one fully-fledged young about 20 feet from the ground in a beech. On the afternoon and evening of June 23rd a search of the 10 acre beech-wood failed to reveal any evidence of Pied Flycatchers.

The nearest recorded breeding locality is in North Derbyshire (*British Birds*, Vol. xxxviii, p. 317 and Vol. xxxix, p. 317) and in view of the three-day adherence to the spot where the Cheshire birds were seen, it seems likely that they had nested in the vicinity and had not moved into the district from a distant breeding-place, at an earlier stage of the young's development. E. F. WHITELEY.

PROBABLE SINGING BY FEMALE GRASSHOPPER-WARBLER.

WITH reference to my note on this subject (*antea*, Vol. xl, p. 345), further circumstantial evidence in support came to my notice during May, 1948.

A Grasshopper-Warbler (*Locustella naevia*) was first heard singing vigorously on a certain patch of suitable territory, on April 23rd. This bird was almost certainly unmated until about May 20th; during the whole of this time, the song was strong and was uttered—for the most part—in full view from the top of a small hawthorn. Frequent watching, at evening and early morning failed to reveal any sign of a hen or second bird. At dusk on May 20th I visited the area and for the first time—to my knowledge—there was no song. My next visit was at dusk on May 24th, when I heard a small snatch of subdued song from near the usual spot and later saw two birds together, their behaviour giving the impression that they were male and female. I visited the place on May 28th at dusk and, upon arrival, I heard a bird singing strongly from a position about 30 yards from the usual singing perch; I could see it quite plainly as it sang from the top of a sprig of bramble. This mystified me somewhat, as I was quite certain that this was not the bird I had been hearing recently and, at first, I thought perhaps it might be a new male that had just arrived. As dusk deepened, however, the usual bird started to sing very softly from his usual hawthorn bush and, as if by some pre-arranged agreement, *the other bird stopped singing immediately*, although I could still see it in position. After a few minutes (during which time the subdued song continued), the bird on the bramble-sprig crept down into the grass and I lost sight of it. Soon afterwards, I saw the bird uttering the subdued song and a second bird together. In spite of frequent and intensive watching, at no other time, before or afterwards, did I hear two birds singing together on that patch (the strong song

was not heard again thereafter), neither did I see or hear anything which suggested that there were more than two birds in all in occupation, and it seems reasonable to assume that the two birds I heard singing were the same that I saw consorting together subsequently. It is possible, of course, that both birds were unmated males but, if so, one would have expected to hear fairly frequent or—at any rate—*some* song from both of them and the birds' behaviour on the occasions I watched them together belied this possibility. Also, the soft, subdued song was typical of a mated bird. Unfortunately, in spite of long and diligent searches, I was never able to discover a nest on this area but, as the patch was a fairly large one and almost every inch suitable for nesting, it is highly possible I missed it, this nest at times being exceedingly difficult to locate.

H. J. HOFFMAN.

BLACKBIRD CARRYING NEST-MATERIAL IN AUTUMN.

ON November 13th, 1947, I twice saw a female Blackbird (*Turdus merula*) carrying nest-material at Iwerne Minster, Dorset. The bird was first seen picking up dead grasses from the ground, with which it flew away. Two hours later the female (recognizable by having a pale wing patch) flew to a dead Clematis stem, from which it plucked loose fibres and carried them to a laurel bush; but there was no sign of a nest structure visible.

P. F. YEO.

EARLY REDSTART IN SURREY.

SINCE *The Handbook* quotes individual March dates for the arrival of the Redstart (*Phoenicurus phoenicurus*) as exceptional, it may be of interest to report that on March 31st, 1948, I found a male in Richmond Park, Surrey, in the early morning. To make it clear that there was no confusion with the Black Redstart I may state that the bird was seen at 15 yards, on a fence at eye level, in perfect light conditions, using a 9x binocular.

R. W. HAYMAN.

"ANTING" OF GREEN WOODPECKER.

ON May 27th, 1948, I observed a female Green Woodpecker (*Picus viridis*) performing the operation of "anting" in a field of rough grass on Horsendon Hill, Middlesex.

The bird first flew from some elms to an ant hill in the middle of the field; after hopping about casually for some minutes it perched on the ant hill, rapidly pecked up some ants, which were running about freely, and vigorously rubbed them beneath its left wing and under the breast feathers. It then called loudly. The whole process was then repeated before the bird flew.

F. G. STANFORD.

CUCKOO'S EGG IN NEST OF SONG-THRUSH.

ON May 15th, 1948, at Ashford, Kent, I found the egg of a Cuckoo (*Cuculus canorus*) in the nest of a Song-Thrush (*Turdus ericetorum*) with one egg of the latter. The nest was visited again on May 19th, but no more eggs had been laid and the thrush had deserted. The nest was in brambles about three feet high. The possible reason for the Cuckoo's use of this nest is scarcity of the usual fosterers since the winter of 1946-7.

H. R. TUTT.

KITE IN ESSEX.

On May 10th, 1948, in Epping Forest, near Loughton, Essex, a hawk-like bird was observed at a considerable height, soaring and drifting. On inspection through binoculars we simultaneously noticed the pronounced forked tail, thus identifying the bird as a Kite (*Milvus milvus*). The light was dull and this, together with the height at which the bird was flying, prevented us from detecting any colour, but we are satisfied that the strong forking of the tail precluded the possibility—in any case remote—of the bird's having been a Black Kite (*M. migrans*), with which one of us is acquainted on the Continent.

In *Birds of Essex* (Glegg) the Kite is described as an exceedingly rare visitor to the county, the last nesting record being 1854, but a male was obtained at Tolleshunt D'Arcy in 1925.

S. AUSTIN AND W. A. WRIGHT.

NOTES ON THE PURPLE HERON.

In *The Handbook of British Birds*, Vol. iii, p. 134, it is stated that in Europe the Purple Heron (*Ardea purpurea*) occasionally nests in low bushes and even in trees. So far as the reference to low bushes is concerned this remark is certainly not applicable to conditions in Holland, where there are still several colonies, all but three of which I know personally, while some of them I have visited year after year.

In my experience the normal breeding habitat of this bird in Holland is reed-beds (which do not need to be of large extent) provided there are low bushes of willows and alders. In these places nests in low bushes are the rule rather than the exception and the nests are built in most cases in the lowest branches of the bushes amidst reed-stems.

In the only colony of Purple Herons which exists in Friesland I found on May 21st, 1944, in the low branches of an alder a nest with 8 eggs (Plate 13). Though clutches of 8 are found from time to time (and are mentioned in *The Handbook*), I believe they are all due to two females. As a proof that the Purple Heron is liable to dispose of its eggs in other nests I can relate the following incident.

On May 17th, 1942, I found in the same locality in a small reed-bed a nest of a Marsh-Harrier (*Circus aeruginosus*) with 5 eggs of the harrier and one egg of a Purple Heron (Plate 13). The nest lay at a distance of about 30 meters from a small colony of 4 pairs of Purple Herons which nested in some alders. Human agency was out of question in this locality and further it was clear that nobody had entered this reed-bed before or visited the Marsh-Harrier's nest. It would have been interesting to observe how things developed after the hatching of the eggs, but unhappily the nest was robbed afterwards by a small mammal.

FR. HAVERSCHMIDT.

FERRUGINOUS DUCK IN COUNTY DURHAM.

ON April 3rd, 1948, Mr. J. R. Crawford, of Sunderland, observed a male Ferruginous Duck (*Aythya nyroca*) on one of a small group of reservoirs near Hebburn, Co. Durham. It was closely associating with a pair of Tufted Duck (*Aythya fuligula*). He had it under observation until April 6th. On April 7th, in company with Mr. M. G. Robinson, I visited the reservoir, where we found the bird and were able to observe it under most favourable conditions. It was an adult drake, bearing all the distinguishing characters of the species; the only feature that we were unable to determine was the white patch of feathers under the bill. It had every appearance of being a wild bird, being very wary and alert. When disturbed by a passing dog, it rose from the water and flew strongly for a few yards, while its companions, the Tufted Duck, contented themselves with merely swimming to safety. By the following morning, April 8th, it had gone, though the pair of Tufted Duck was still present on the same water. It has not been reported since, either there or elsewhere in the county. This is the first occurrence of the species in County Durham.

GEORGE W. TEMPERLEY.

[Although, as we have stated on a number of occasions, it is scarcely possible to be certain that Ferruginous Ducks in this country are not "escapes", it is deserving of note that although there has been an increase in the number reliably recorded in recent years there are now excessively few in captivity in the British Isles—only two drakes are recorded in the latest summary of the Avicultural Society's "Waterfowl Registry" (*Avicult. Mag.*, Vol. liv, 1948, pp. 62-5). There is thus a good *prima facie* case for regarding apparently wild birds as actually so and for thinking that the visits of the species to this country may be actually becoming somewhat more frequent.—Eds.]

DISPLAY OF COMMON CURLEW.

ON May 11th, 1948, at Kirkley, Northumberland, I watched a form of display by a party of Common Curlew (*Numenius arquata*), which was more elaborate in performance than that described in *The Handbook*. First a single Curlew flew down into a grass field emitting the usual spring trilling call, to be joined after a minute or two by a further pair. Immediately the first bird adopted an extraordinary stance; ruffling all its feathers, hunching its shoulders and drawing its neck in, crouching low on its legs until its body almost touched the ground, drooping its wings, and holding its beak in a position almost vertical to the ground, it commenced to pursue the female of the newly arrived pair. In the meantime a second female appeared from the grass, possibly from a nest, whereupon the second male took up a similar attitude to the first male, and proceeded to chase this female. This pursuit continued for some time (about 20 minutes), usually in wide circles,

but the two pairs remained in the same area within a few yards of one another the whole time. During the course of this pursuit one of the males flew off, and its place was taken by another from an adjoining field.

The males became more and more excited, and called several times a note resembling the "quaek" of a Teal, and also the flight trill whilst running. The females always managed to remain about two feet in advance of the males, and retained a very upright position with upstretched necks, heads held high, and their plumage held tightly against their bodies. Several times the males fluttered off the ground towards the females, apparently attempting copulation, but on each occasion the females eluded them by flying off for a few yards. This action caused the males to take up very odd positions; tilting their heads forward until they touched the ground, lowering their wings even further than previously, and spreading their tails, they thus arched their bodies to show the white rumps in a most striking manner. After about half an hour they disappeared out of view in a hollow, and on my closer approach they flew off, and the party broke up.

JOHN ASH.

AGGRESSIVE BEHAVIOUR OF COMMON SNIPE.

ON the evening of May 8th, 1948, on a breeding ground of the Common Snipe (*Capella gallinago*) near Glasgow, I observed two of these birds which flew into the air with wings beating furiously, pecking and biting each other while in the air. A third snipe was sitting unconcernedly on a post of the fence near them. I presumed that this was a female and the other two males.

Being unable to see what the two birds were doing on the ground, owing to the depth of the grass, after watching for about 10 minutes I decided to move closer. After about 20 yards the presumed hen bird saw me, and I immediately took cover, luckily within easy sight of the two birds on the ground.

For at least a quarter of an hour I watched these two go through the following routine; with tails raised, and possibly slightly fanned, bird "A" would follow bird "B" until the latter stopped and turned round. Both birds would then crouch slightly, walk slowly towards each other, pass as if rubbing shoulders and, when about 6 inches apart, would stop, turn round, raise themselves erect, and without any warning leap into the air with wings flapping vigorously and proceed to "fence" most energetically with their bills. After perhaps 3 seconds when they again touched ground, one would run away, and when caught up by the other the same performance would take place again.

All this time the third snipe sat on the fence doing nothing except occasionally lower her bill to peek or preen her breast. When the two on the ground found themselves too far away, they would move back towards her, fighting all the time.

At last one appeared to have the upper hand, and the vanquished bird flew away, hotly pursued, out of my sight. I heard no noise throughout the fighting, but just as they were disappearing from view both turned into a sharp dive, and drummed for a fraction of a second. The female remained on the fence.

No other form of attack than pecking and perhaps hitting with wings was noticed, except once when I thought I saw one of them strike backwards with its feet at its opponent. Throughout, the white undersides of their tails were noticeable, and also the crouching attitude as they passed close to each other.

JOHN ORMISTON SINCLAIR.

BEHAVIOUR OF AN INCUBATING OYSTER-CATCHER.

It is well known that an incubating Oyster-catcher (*Hæmatopus ostralegus*) on intrusion of its domain will step off stealthily from its eggs and will run away in a rather stooped attitude for some distance.

I witnessed a striking example of this apparently stereotyped behaviour on May 16th, 1942, in the dunes at Vogelenzang near Haarlem, Holland. To keep off the numerous rabbits a small enclosure had been made, fenced off with wire-netting. The enclosure measured about 15 x 15 metres and the height of the fence was about 1½ metres. On approaching I saw an Oyster-catcher run away and subsequently found its nest with two eggs on the bare sand in the enclosure. Now it was interesting to observe that the bird on running away almost immediately came in contact with the fence, which prevented it from running further. What in my eyes was most amazing was that the bird insisted in trying to get through the wires though it could easily escape by flying over the low fence. Even as I stepped over the fence and walked towards the bird it did not fly, but continued its fruitless efforts to get through the wires. As I had no rings with me at that moment I did not catch it, but contented myself with taking a few photographs, one of which (reproduced in plate 14) shows the bird calling nervously and trying to get away through the wires.

When I withdrew the bird at last took wing and disappeared. Its behaviour led me to the conclusion that the bird when surprised suddenly on its eggs simply had to walk a certain distance before being able to fly away and that the intervening wire fence prevented it from covering that prescribed distance, so that it could not respond wholly to that impulse. On the other hand I have several times flushed Oyster-catchers straight from their eggs, so that there certainly are exceptions. FR. HAVERSCHMIDT.

OYSTER-CATCHER'S NEST WITH FIVE EGGS.

On May 17th, 1948, I found a nest of the Oyster-catcher (*Hæmatopus ostralegus*) containing five eggs on the island of Samson in the Isles of Scilly. A photograph of this is reproduced on Plate 14.

J. A. B. GALE.

LESSER BLACK-BACKED GULL PERCHING ON TREE. WITH reference to the note (*antea*, Vol. xli, p. 126) under this heading I have a note of seeing an adult Lesser Black-backed Gull (*Larus fuscus graellsii*) perched at a height of about twenty feet on a bare branch of a tree beside a small ornamental pond in Kelvingrove Park, Glasgow, on March 14th, 1948. Several Black-headed Gulls (*Larus ridibundus*) had alighted in the same tree.

W. G. TEAGLE.

YELLOWHAMMER AND REED-BUNTING SINGING IN FLIGHT.—Mr. C. W. Towler reports a case of a Yellowhammer (*Emberiza citrinella*) which was heard to deliver a complete song in a brief flight of a dozen yards or so at Thurleigh, Bedfordshire, on May 29th, 1948. Mr. Fr. Haverschmidt also informs us that in Holland on July 3rd, 1921, he observed a Yellowhammer singing its full song in flight, while on May 17th, 1942, he observed a Reed-Bunting (*Emberiza schoeniclus*) which delivered the full song when flying from one bush to another.

EARLY GARGANEY IN CUMBERLAND.—Mr. Robert Walker reports that he identified a pair of Garganey (*Anas querquedula*) at Siddick Ponds, near Workington, Cumberland, on March 4th, 1948. This is an unusually early date, but Mr. Walker is confident that the birds were present on March 1st, though he was not certain of their identity at that time. They had apparently left by March 6th.

LETTER.

HOUSE-SPARROWS PURSUING PIGEONS.

To the Editors of BRITISH BIRDS.

SIRS, —The Handbook does not mention the common habit of the House-Sparrow (*Passer domesticus*)—at least in London—of pursuing pigeons, and the only reference I can find in literature is that of Finn: *Talks about Birds* (1911). So far as I have seen, the pigeon is always attacked in flight, the sparrow apparently endeavouring to fly beneath the pigeon's wing close to its body and presumably to peck at it, although owing to the speed at which both birds move it is not possible to be sure on this latter point. The pigeon shows every sign of fear, flying at great speed, twisting and swerving; in short behaving much as it does when attacked by a falcon, save that it never—so far as I have seen—drops to the ground to take cover, or dives headlong into a hole as it may if a bird of prey is chasing it. The sparrow usually keeps level with the pigeon, which is flying at well above its normal rapid travelling speed, for a distance of up to about two hundred yards, but commonly less, and then drops behind and flies away. It does not appear ever to pluck any of the pigeon's feathers. The feral Domestic Pigeon (*Columba livia*) is by far the commonest victim, but I have observed similar pursuits of the Wood-Pigeon (*Columba palumbus*), Blackbird (*Turdus merula*) and (once) Mistle-Thrush (*Turdus viscivorus*). Finn mentions having seen the Mallard (*Anas platyrhynchos*) and Starling (*Sturnus vulgaris*) victimized in this manner.

When on Malta I several times observed racing pigeons pursued in this way by the Spanish Sparrow (*Passer hispaniolensis maltae*), but have never seen any other small bird behaving similarly. This behaviour is certainly in no way analogous to the so-called "mobbing" of predatory birds, since the sparrow normally shows no sign of fear or apprehension of the pigeon, nor is more than one sparrow involved at a time.

DEREK GOODWIN.

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NOTE.

The Editor regrets that it has been found necessary to postpone publication of his paper on subspecies (announced for March in the January Editorial) until the May number.

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BRITISH BIRDS

NUMBER 3, VOL. XLII, MARCH, 1949.

OBSERVATIONS IN A ROOKERY IN WINTER.

BY

C. M. OGILVIE.

THE rookery under observation was first built in 1946 in a small beech copse within a few hundred yards of two larger colonies. In the spring which preceded these observations fourteen nests were built, but only nine survived the gales of mid-April and no further nests appeared after that time.

A daily record of the time and duration of Rook visits and of the weather was made during the last fortnight of December, 1947. On four days a continuous observation was maintained for almost the whole period of the Rooks' visits (about ten hours altogether).

THE TIME AND DURATION OF VISITS.

Rooks (*Corvus frugilegus*) visited the colony every day during the fortnight of observation. The number varied considerably during the day, eighty-five being the largest recorded at any one time. Some birds at least had arrived before 9.15 a.m. (G.M.T.) each day (usually about 8.30 a.m.) and none was observed in the rookery on any occasion after 2.30 p.m. (and after 11.30 a.m. on only two occasions). The longest time for which the rookery was occupied on any day was four and a half hours, while the shortest visit lasted forty-five minutes; on both these days, the weather was mild and the sky overcast.

Jackdaws (*Corvus monedula*) were only rarely present in the rookery and never appeared in parties of more than three or four birds.

BEHAVIOUR OF BIRDS NOT OCCUPYING OLD NESTS.

The great majority of birds visiting the rookery showed no interest in the nests except for brief visits when food was apparently taken from among the sticks; pairing was not marked among birds not occupying or "sieging" a nest. These "non-nesting" Rooks perched in irregular groups, fed occasionally from the bark, and often flew about in parties of four or five together. They greeted all new arrivals to the rookery with a chorus of excited cawing, their necks outstretched and tails fanned.

No signs of mating behaviour were noted, but bill-wiping occasionally occurred; twigs were sometimes taken from the branches, but these were soon released. Small groups of these Rooks, however, showed signs of great excitement, which, though probably sexual in origin, did not lead to pairing or nesting activity. One such party of four birds remained together for some seventy to eighty minutes; flying swiftly, they chased each other in the air and, with wings momentarily stilled, made frequent contact with the leading bird. This party often settled in the rookery, where they were noisy and restless—bill-wiping, plucking at branches and repeatedly flying at each other.

BEHAVIOUR OF BIRDS AT THE NEST.

1. *Nest occupation and Defence.*

Six nests remained from the previous breeding-season. These were occupied by paired birds on numerous occasions, but (as stated above) there was little evidence of pairing among Rooks not occupying nests. These "nesting" birds tended to stay in the rookery longer and to return earlier than other Rooks; on three occasions, a pair stayed by the nest for over an hour. Two of the nests were used more frequently than the others, while several often remained unoccupied at times when there were large numbers of Rooks in the branches near by.

A pair of Rooks was sometimes challenged at the nest by another pair even when adjacent nests were untenanted; this occurred on at least three occasions and once the battle continued for nearly ninety minutes. There was evidence of continuous tension and excitement in these conflicts and both birds of each pair took an active part in attack (or defence); one of the nesting Rooks would sometimes fly out and engage or pursue one of his opponents, and I am fairly certain that the same two birds were always involved in these excursions (probably the cocks). The challenging pair would often fly around for a few minutes and then return to their original position, but the nest was never left unguarded by the other pair. I witnessed one of these episodes in another rookery at about 4 p.m. (G.M.T.); this colony was not used as a communal roost and had been deserted for the day several hours previous to my observation. The two pairs—one occupying the nest and the other beside it—were still present some three hours after dark. Single Rooks approaching an occupied nest were frequently repelled by the nesting pair. In some cases, however, "territorial" behaviour was less marked; one pair replaced another at the nest without a fight and on another occasion a pair moved from one nest to another of their own free will.

The nest remnants appeared to provide a rich source of food; the Rooks—and, in their absence, Starlings—often fed voraciously on the contents. In the case of feeding pairs, this may have been a form of functional display, for I could not always be sure that food was actually consumed.

2. *Courtship and Sexual activity.*

Although coition never took place during the period of observation, I witnessed various courtship phenomena on or beside the nest. Bill-wiping occurred on at least five occasions, but this was also practised by "non-nesting" birds. There were two instances of bill-fondling between Rooks on the nest. On one occasion, the pair stood side by side; the one bowed and cawed, and the other stroked the beak of its partner in the interval between each bow.

Another pair frequently practised mutual preening and one of these performances lasted for over thirty minutes. I noticed that the preening bird confined its activity to those parts of its mate

which the latter would have found inaccessible: the throat, crown, forehead and face. Yeates records a similar occurrence in the summer, when the preening was again restricted to the head parts.

The feeding of one Rook by another took place on four occasions:—

(a) Two Rooks were feeding on the nest; one bird appeared to give food to the other with very little fuss or ceremony (this may possibly have been an example of beak-fondling).

(b) A Rook standing on the nest gave food to another which was perched beside the nest amid much cawing and wing-flapping. This ceremony suggested the feeding of a fledgling by its parent rather than the ritual feeding of a mated hen.

(c) On the two other occasions, the ceremony was typical of the ritual feeding of a hen bird by her mate. After an absence of some ten minutes, the (presumed) male bird joined his mate at the nest; the (presumed) hen, quivering and crouching low, accepted food to the accompaniment of a muffled cawing which I found to be a characteristic feature of the ceremony. This took place on December 29th (some nine days before the earliest record of ritual feeding quoted by *The Handbook*), one of the coldest days of this period. There was no sun, a moderate fall of snow and the temperature was recorded at 40°F.

Although I witnessed no serious attempts at building and the ceremonial presentation of a stick was not observed, various stick manipulations did occur on four occasions: one Rook broke off a small branch and added it to the nest; another removed a twig from the nest and replaced it; a third carried a small twig from the nest to his mate, who was perched above him, but did not actually present it; on the fourth occasion, a Rook busily arranged the sticks in a nest until joined by another bird with whom it had been conducting a cawing duet for several minutes.

SUMMARY.

The daily visits of Rooks to a small rookery were recorded for two weeks in December, 1947; on four days, the behaviour of the birds was closely observed.

The colony was visited by Rooks within two hours of dawn every day and, except on two occasions, was finally deserted at least five hours before dusk. The number of birds varied considerably during the day and Jackdaws were rarely present.

The majority of birds displayed no pairing or nesting tendencies, but indulged in group flights and other activities associated with considerable mutual excitement.

Several paired birds regularly occupied the nest remnants and frequently but not invariably defended their territory; a preference for certain nests and the neglect of others was noted.

“Nesting” Rooks showed pairing and courtship activity: bill-fondling, mutual preening and ritual feeding were observed, but coition never ensued and nest construction was not attempted.

The birds appeared to derive a considerable amount of food from the nests.

Variation in weather conditions did not obviously influence the behaviour of the Rooks or the duration of their visits to the colony.

CONCLUSIONS.

With such limited evidence, one can only speculate on the significance of winter activity in the rookery. Is the behaviour symbolic and mainly functionless or is it a purposive and perhaps essential part of the colonial breeding cycle?

The visits of the larger flocks (sometimes in numbers greater than can be accounted for by the breeding members of the colony) may be determined by the gregarious instinct dominant in winter, while nest occupation and courtship between pairs may be purely symbolic acts evoked by the sight of the old nests. Fraser Darling (*Bird Flocks and the Breeding-Cycle*) describes how the presence of a nest of Herring-Gulls (*Larus argentatus*) led to a display of mock-nesting behaviour by a pair of Lesser Black-backed Gulls (*L. fuscus graellsii*); this pair subsequently built their own nest at an earlier date than usual. Darling suggests that (in colonial birds) both communal and "private" displays may provide visual stimuli essential for the maturation of the gonads and the completion of the breeding cycle. This may indicate the significance of the activities of Rook groups and the display of nesting pairs in the rookery during the winter.

The vigorous character of nest defence, on the other hand, suggests that nesting behaviour may be purposive and directed toward the staking and maintenance of territorial claims by paired birds. The unequal popularity of the nests also indicates that the choice of nesting site is not entirely fortuitous. The nesting birds probably consisted of pairs mated in the previous breeding-season; their number is in keeping with this suggestion. If, as Yeates suggests, mated Rooks tend to return to their original nest in subsequent seasons, then the unequal occupation of the nests may have been determined by the proportion of nest and Rook casualties during the year. Thus, a pair bereaved of their nest may challenge the owners of the nest nearest to the site of their old one, while the nests of Rooks not surviving the winter remain unoccupied.

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THE UNDER-WATER MOVEMENTS OF THE DIPPER.

BY

H. G. BROWNLOW.

THIS subject was discussed in an interesting article (hereinafter called article A), in *British Birds*, Vol. xxxii, pp. 58-63. The authors proved that Dippers (*Cinclus cinclus*) walk on the bottom under-water when feeding, but left the means by which they do so undecided. Among the concluding remarks of the article was "Comte de Vogué has offered a tentative mechanical explanation, the essence of which is that the bird is kept down by having its head constantly lowered, and allowing the force of the current to play on its slanting back."

The late Dr. D. M. Dewar, in an article in the same volume (pp. 103-6), described an ingenious experimental demonstration of the de Vogué theory. He used a hardwood board $4\frac{1}{2}$ ins. by $1\frac{1}{2}$ ins. by $\frac{1}{4}$ in., maintained at an angle of 20 degrees to the water in his bath by suitably arranged strings, and found that it plunged down below the surface when pulled along at very low speeds. Its critical speed, that is the speed at which it just tended to rise to the surface again, was 0.36 miles per hour, or 0.53 feet per second. This experiment has, apparently, been assumed to support the de Vogué theory in varying degrees by different ornithologists. *The Handbook* relaxes the admirable scientific caution of the remark quoted above to the extent of calling the theory "a probable explanation". Other less careful authors and speakers occasionally announce the theory as a proved fact. The theory does not seem to have been tested as it should have been, both logically and by field observations. The outbreak of war probably prevented this. The objects of this article are to initiate such an investigation, to show that there are good reasons, on both counts, to doubt that the means postulated by it are the main ones by which the bird keeps down, and to put forward for consideration what I think to be the most probable means by which it does so.

THEORETICAL CONSIDERATIONS.

To assess its probability theoretically, it is necessary to be clear about the different effects of a current on a free swimming, and on a submerged wading bird. If the bird swims freely the only effect of the current is to make its movements *relative to the land* the resultant of its "still-water" movements *relative to the water* and the movement of the water itself, that is the current. The only effect of a current on a freely swimming bird is, therefore, in the direction of the current, and the theory does not apply to such a bird. For the theory to apply, the bird must be anchored to *terra firma*, or be pulled upstream by means of holds on *terra firma*. Thus Dr. Dewar's board was pulled along by him, and a flying ferry, which works on the same principle, turned through a right angle, is anchored to some point upstream. The observations quoted in article A prove that the bird walks on the bottom, with only occasional and momentary use of its wings. The only means

then, by which it can prevent itself being swept downstream, and by which it can apply the de Vogué principle is by foot-holds on the bottom. If its foot-holds are strong enough to maintain its position against the current, or to haul it upstream against the current, it is surely unnecessary to assume that it uses any other means to overcome its submerged buoyancy, which calculation shows to be not greater than about an ounce-and-a-half, if the smallest reasonable specific gravity of the bird is assumed.

If the de Vogué theory is true, the Dipper must always work upstream against the current, but observations of a French ornithologist that "the Dipper moves in all directions, and not only against the current" are quoted in article A, and the authors state that their own observations confirm this. Yet, later in the article, observations of two of the authors are quoted, stating "When entering fairly fast-running water, it appears always to face the current".

Dr. Dewar, in his article, implied that a Dipper walking under-water in still water makes its own current by forward movement. A ground-feeding bird searching for food does not, however, move steadily forward, but moves forward a pace or two, and halts for comparatively long periods. The observations of French ornithologists quoted in article A also state that the bird "moves in a leisurely way, and turns on its tracks and pecks about in search of food".

I am very loth to attack the work of so distinguished an authority as Dr. Dewar, but when the mathematics of the de Vogué theory are investigated, it becomes evident that he, quite unconsciously, unduly favoured the theory in his experiment, by using a flat thin board, which would have a very low critical speed, to represent a relatively plump object like a bird. The effect of even a slight increase in "plumpness" on critical speed can be appreciated by considering the different ways in which a thin piece of paper and a piece of cardboard of the same area fall through the air. Calculation shows that the Dipper's critical speed according to the theory cannot be less than two feet per second, and is probably somewhere between two and four feet per second.

On the evidence produced in Vol. xxxii, therefore, I suggest that the theory is, at the best, suspect.

FIELD OBSERVATIONS.

I have watched Dippers at various times in the last year on the River Laver near Ripon, and on still shallow artificial ponds in the grounds of Fountains Abbey. The Laver is a stream running over stones with occasional weirs, and frequent runs with speeds of water up to about five feet per second. I was led to doubt the de Vogué theory by the following observations:—

(a) A Dipper was feeding completely submerged between two stones set in a line at right angles to the current, which was about four feet per second. It dived in with a small jump without use of wings, and appeared to fly out of the water on to the stone at

which it emerged. It worked backward and forward between the stones several times, and always appeared to dive in and fly out exactly along the line joining the stones.

(b) I have seen Dippers on several occasions, feeding on the Laver in shallow water, so that they were at times submerged and, at others, only partially submerged. Their movements were the typical intermittent movements of a ground-feeding bird searching for food, and on all these occasions they worked approximately across the current, and on no occasion upstream. Current speeds varied between three and five feet per second.

(c) I saw a Dipper feeding in a current of 0.5 feet per second at the side of a long pool on the Laver. Most of its movements were across the current or obliquely against the current. When it moved in these directions, the length of its under-water movements was $1\frac{1}{2}$ to 2 feet. Once it did a series of under-water movements directly against the current. This was the only occasion on which I have seen a Dipper move under water directly against the current. The depth of water was such that it could come up to breathe by merely raising its head. When it did so, only its head showed above the water, and it remained quite still in that position for several seconds. The force of the current must then have been working upwards on its sloping breast. I am convinced, from the stillness of its head, that it was not moving its wings. The length of its under-water movements upstream was only six to nine inches. Twice it found some prey which it evidently preferred to eat on dry land. Each time, it "flew" through the water to the bank. I could see its bill and wings just breaking surface. Its speed through the water was most markedly faster than its normal under-water speed. I estimated it at between one and two feet per second.

(d) I have seen Dippers submerge by wading in still water in three places. In each case the water was only just deep enough to cover the bird in the feeding position. The three observations were:—

(i) On a stony bottom between two large stones at the side of a pool above a weir in the Laver. The bird waded in shelving water until it was totally submerged and appeared again, still wading, about a foot further on. I am confident that it did not move its wings.

After I had calculated the critical speed of the Dipper, I set out to time the speed of the bird under-water in still water. I succeeded in doing this in the ponds near Fountains Abbey. I took the times by stopwatch, and judged the distance travelled by estimates in each case that it could not be less than x or greater than y . In one case in observation (d) (ii), I saw a bubble break surface slightly out of the line between the points of submergence and re-emergence. In the final estimate of speed I have therefore added 25 per cent. for possible extra distance travelled owing to the course being not straight.

(ii) A Dipper was searching for food at the edge of a pond where the bottom was soft mud and decomposing leaves with weed. Every second or two I could see a momentary flick of the wings, as recorded by the authors of article A in one of their observations.

(iii) A Dipper was searching for food in another pond among the branches of a large bough which had fallen in.

The results of observations (d) (ii) and (iii) are as follows:—

Observation	Least estimated		Greatest estimated		Time secs.	Speed ft./sec.	
	distance x ft.	ins.	distance y ft.	ins.		From	To
d(ii)	3	0	4	0	14.6	0.20	0.27
d(ii)	4	0	6	0	18.4	0.22	0.33
d(iii)	1	0	1	6	4.6	0.22	0.33
d(iii)	0	9	1	0	4.2	0.18	0.24
d(iii)	1	0	1	3	5.2	0.19	0.24
d(iii)	1	3	1	6	5.0	0.25	0.30
Average of these speeds						0.21	0.28
Adding 25 per cent.						0.26	0.35
Greatest speed recorded plus 25 per cent.							0.41

DEDUCTIONS FROM THESE OBSERVATIONS.

(a) That the Dipper only rarely works upstream against the current, and then in only the slowest currents. Observation (c) gives a possible reason for this—that when working upstream, its speed over the bottom, and hence its area of search for food, is reduced. Part of the evidence in article A is, however, directly contradictory to this deduction, and I suggest that this doubtful matter should be settled by observations by other ornithologists.

(b) That the observed speed of the Dipper, which did not exceed 0.4ft. per second, is less than the critical speed of Dr. Dewar's board, 0.53ft. per second, and very significantly lower than the calculated critical speed of the bird (not less than 2ft. per second). I think that these results prove conclusively that the de Vogué effect cannot be the principal means by which the bird keeps down.

(c) That when searching for food the bird uses its wings only when it fails to get a firm foothold. The weeds in one pond presumably did not give a secure foothold, and it used intermittent flicks of its wings to keep down. The twigs of the branches in the other pond probably provided such a foothold, as did the stones in observation (d) (i). The interesting observations of P. F. Holmes recorded in another article in Vol. xxxii agree, I think, with this

There is, of course, a possibility that the bird increases its specific gravity to over unity by collapsing cavities in its body, but it would also, in that case, when working in a current, have to prevent itself by footholds from being swept downstream.

No evidence for this capacity has, as far as I know, been produced by museum workers or by field observers, and I think the idea is inherently less likely than the theory that it keeps down by footholds whenever possible.

It probably gets slight assistance from the de Vogué effect when it does face upstream, but this is not due to any special adaptation, but because the natural posture of a ground-feeding bird searching for food is to stand with its head down.

I realize that some authorities have stated that the bird keeps down apparently without assistance from its feet. I am very doubtful, however, that it is possible to see distinctly what it does with its claws under water.

Finally I put forward the following tentative conclusions as the most probable account of the bird's under-water movements.

(a) It normally uses footholds to keep it down.

(b) It uses its wings under water:—

(i) to swim down to the bottom, and up to the surface again, in water deeper than a few inches.

(ii) to keep down and regain foothold if it loses its grip when searching for food.

(iii) to search for food if the bottom is unsuitable for footholds.

(iv) when there is urgent need to return quickly to the bank.

THE APPARENT SURVIVAL-RATE OF RINGED HERONS*.

BY

DAVID LACK.

(Edward Grey Institute of Field Ornithology, Oxford.)

AGE AT DEATH.

To determine the average age of the Heron (*Ardea cinerea*) in Britain, the recoveries have been utilized of all Herons ringed as nestlings up to and including the year 1935, but those ringed after 1935 have been omitted, as some of them might still be alive. The method of analysis follows that of previous studies (Lack, 1943, 1946), so need not be explained again. Deaths are grouped in years, each year being reckoned from June 1st to May 31st. The survival figures in Table 1 are reckoned from the time that the young leave the heronry, the few young found dead before they left the heronry being omitted.

TABLE 1. AGE AT DEATH OF HERONS.

Ringed as nestlings before 1936.

(Year calculated from 1st June-31st May).

<i>Year.</i>	<i>No. found dead.</i>
1	135
2	15
3	17
4	6
5	7
6	8
7	2
8	1
9	1
10	1
11	1
16	1
Total	<u>195</u>

Found dead in 1st year 69%.

Average annual mortality after 1st year 31%.

Expectation of further life at leaving nest 1.5 years.

Expectation of further life at start of 2nd year 2.8 years.

NOTE.—Average annual mortality = $\frac{D_2 + D_3 + D_4 + \dots}{D_2 + 2D_3 + 3D_4 + \dots}$ where D_2, D_3, D_4, \dots = number found dead in 2nd, 3rd, 4th years respectively.

The data in Table 1 show that, of the recovered Herons, as many as 69% were found dead within a year of leaving the heronry. The mortality in each subsequent year was much lower, on the average only 31%. Correspondingly, a young Heron at the time of leaving the nest survived on the average for only another 1.5 years, whereas a one-year-old Heron survived on the average for a further 2.8 years. Lack (1946) found for various other species that the juveniles had a higher mortality rate than the adults, but the difference was not nearly so large or so extensive as in the case of the Heron. Its extent is shown by analysing separately the recoveries for one season of the

* Publication of the British Trust for Ornithology.

year (but in all years) as in Table 2. This shows that the high juvenile mortality continues throughout the first year of life, whereas in small passerine species it is effectively over by the first January 1st of life (Lack, 1946). It was for this reason that the survival of adult Herons in Table 1 was reckoned from June 1st in the second year of life (instead of from January 1st in the first year of life, as in previous studies). In the Herring-Gull (*Larus argentatus*), the juvenile mortality seems as high as in the Heron (Marshall, 1947).

TABLE II. DECREASE IN MORTALITY WITH INCREASING AGE.

Period.				Total found dead.	Found dead in first year.	% dying in first year.
June-September	...	...	...	51	39	76%
October-December	...	...	...	53	38	72%
January-April	...	...	...	75	51	68%
Second year.					Second year.	Second year.
May-July	...	...	...	23	10	43%

- NOTES.— (i) Average annual adult mortality 31%.
(ii) The figures in the right-hand column suggest a progressive improvement in survival rate as the birds get older, but there are not enough data to prove this.

The validity of the figures in Table 1 can be checked by calculating the population-turnover of the Heron. The annual mortality among the adults, of 31%, should be approximately balanced by a similar number of juvenile birds breeding for the first time. When he visited the nests in late June, just before the young flew, F. A. D. Hollom found an average of 2.14 young per nest (see Table 3). This figure does not allow for pairs which failed to rear any young, but, if it is accepted provisionally, it means that every 100 adults raise 107 fledglings per year. The data in Table 1 suggest that, of these 107 fledglings, 69% die before the following June 1st, leaving 33 survivors. Now it is usually supposed that Herons do not breed until they are two years old, in which case one must allow another full year's mortality among these survivors, at the rate for adult Herons of 31%, which reduces their number from 33 to 23. Hence only 23 new breeding birds remain to balance the 31 adult deaths, a serious discrepancy, and the difference is rather greater if the average number of young raised per pair is less than 2.14.

The above difficulty disappears if Herons breed when one year old, a point on which there seems to be no definite evidence either way. However, a more likely explanation of the discrepancy is that the sample of recovered birds gives a misleadingly low idea of survival. This might happen for one of two reasons. First, many of the recovered Herons were shot. As shown by Lack (1943) for the Black-headed Gull (*Larus ridibundus*), it is easier to shoot a juvenile than an adult bird, hence the sample of shot birds includes too high a proportion of juveniles, and the average age of the sample is lower than that of the wild population. Secondly, Kortlandt (1942) has shown that in the Cormorant

(*Phalacrocorax carbo*) a proportion of the older birds lose their rings, due to abrasion and the action of salt water; this results in the recovered sample including too few old birds, and hence the average age is misleadingly low. The Heron feeds mainly in fresh water, and does not scrape its ring on the ground, hence loss of rings may not be nearly so serious a factor as in the Cormorant.

BROOD-SIZE.

Jourdain (1939) gives the usual clutch of the Heron as 3-5 eggs. It is reasonable to suppose that the number of young hatching per successful brood is only slightly lower. On the other hand, there is a heavy nestling mortality, so that the number of young leaving each nest is much lower than 3-5. Data in Table 3 show that, at the Fawley Court heronry, where the young were ringed at the end of April or in the first week in May, (i.e. at a very early stage), the average size of brood ringed was 3.8. On the other hand, at the High Halstow heronry, where the young were ringed in late June, at a very late stage, the average size of brood ringed was only 2.1. There is no reason to think that average clutch-size would be different at these two heronries, which are only about 65 miles apart. The difference between 3.8 and 2.1 ringed young per nest is due to the heavy mortality which the nestlings experience between the time that they are about a week old and their leaving the nest.

TABLE III. BROOD-SIZE.

Brood-size.	No. of broods ringed in	
	late April- early May.	late June.
1	0	27
2	4	40
3	13	34
4	40	4
5	8	-
Total	65	105
Average	3.8	2.1

The late April-early May broods were ringed at Fawley Court in Buckinghamshire, the late June broods at High Halstow in Kent.

SURVIVAL IN RELATION TO BROOD-SIZE.

Moreau (1947) has shown for various species that, the larger the brood, the less food each nestling receives. It might therefore be expected that nestling mortality would be higher in a brood of large than a brood of small size, and this has in fact been proved for the Alpine Swift (*Apus melba*) (Lack and Arn, 1947). Someone who likes climbing trees should undertake a similar study for the Heron, and the results would be of considerable scientific importance. All that is needed is a count of the number of young in each Heron's nest at the time of hatching, and a similar count just before the young leave the nest. Nesting success should then be calculated for each brood-size separately. Such a study ought to extend over at least two years and to include a sufficiently large number of nests to give reliable averages.

In small passerine birds, affairs are rather different from what they are in species with a long nestling period. The effect of under-nourishment on the nestlings is not to cause death in the nest; instead, the fledglings tend to leave the nest below normal weight, and this adversely affects their chances of subsequent survival. Through an analysis of ringing returns in relation to brood-size, it has been shown for the Starling (*Sturnus vulgaris*) that proportionately more individuals survive to maturity among those raised from broods of small size than among those raised from broods of large size (Lack, 1948). A parallel analysis has been carried out for the Heron in Table 4, the number of Herons which survive until they are at least three months old being compared with the number of each brood-size originally ringed. This *appears* to show that, as in the Starling, survival is better from broods of small than large size. In the case of the Heron, however, this conclusion is misleading, and this section of the paper has been included primarily as a warning against a superficial analysis of ringing data.

TABLE IV. RECOVERIES ACCORDING TO BROOD-SIZE.

Brood-size.	Number of young ringed.	No. recovered more than 3 months old.	% recovered.
2	293	36	12%
3	501	62	12%
4	347	25	6%
5	54	1	
Total	1195	124	10%

NOTES.—(i) One member of a brood was sometimes too young or too active to ring, hence the number of young ringed is not always an exact multiple of the brood-size.

(ii) Only one ringer separated broods of 1 young from odd nestlings ringed, hence the figures for broods of 1 young are omitted from Table 4.

In the Starling, many thousands of young were ringed by many different ringers in different places, and all the young were ringed at approximately the same age. Hence the data are both extensive and uniform. In the Heron, on the other hand, marked bias arises because most of the ringing was carried out in a few restricted localities by a few ringers; further, the young were often ringed at very different ages. When the young are ringed at an early stage the heavy nestling mortality has yet to come, hence they are still in broods of large size, and many will die before they leave the nest. When the young are ringed at a late stage many will already have died, hence they will tend to be in broods of small size, but a much higher proportion will leave the nest successfully. For this reason alone, the recovery-rate will *appear* to be higher for young from small than large broods. Of the Fawley Court birds (ringed very early, and hence in large broods) only 3% were recovered, but of the High Halstow birds (ringed very late, and hence in small broods) 17% were recovered.

There is another small, but important, source of bias, since,

even allowing for differences in the age at which the young are ringed, there are marked differences in the recovery-rate from different heronries. The birds ringed by C. S. Clarke in Bedfordshire and Cambridgeshire were mostly ringed when rather young (average brood-size more than 3 per nest), but the recovery-rate here was higher than from any other group of heronries (21%). The reason for this is not known, but perhaps an unusually large number of Herons are shot in this district. Clarke's data include a higher proportion recovered from broods of small than large size. However, if Clarke's data are added to the general totals, in which both average brood-size and average recovery-rate are lower, the effect is an *apparent* increase in the recovery-rate from broods of large size! Again, the recovery-rate from High Halstow in Kent was rather lower than expected, considering the late stage at which the young were ringed. This was almost certainly because many of the juveniles from this colony winter in France, and the chances of recovering a British ring are smaller in France than England.

The above considerations show that the data from different heronries cannot be combined. It might still be considered that the results from single heronries could be analysed separately. However, the ringer did not always visit the heronry at the same time each year, and, even if all the young were ringed on the same day, they would be of rather different ages. Hence even a analysis of individual heronries is likely to be misleading, and this line of investigation had to be abandoned for the Heron.

SUMMARY.

1. From the recoveries of Herons ringed as nestlings, the mortality in the first year works out at 69%, and the average annual mortality in later years at 31%. This gives an expectation of further life at the time of leaving the nest of 1.5 years, and at the start of the second year of life of 2.8 years.
2. The above apparent mortality may be somewhat too high and the possible causes of bias in the data are considered. Many ringed Herons are shot, hence the sample perhaps includes too high a proportion of juvenile birds.
3. In late April and early May, each Heron's nest contains an average of 3.8 young, but the heavy nestling mortality reduces this figure to 2.1 young by the time that the birds leave the nest in late June.
4. Ringing data give misleading information as regards survival in relation to brood-size owing to marked differences in (a) the age at which young Herons were ringed and (b) the recovery-rate from different heronries.

ACKNOWLEDGEMENTS.

I am much indebted to Miss E. P. Leach for placing the *British Birds* ringing records at my disposal, and to Miss E. T. Silva for help in counting the ringing schedules.

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STUDIES OF SOME SPECIES RARELY PHOTOGRAPHED.

XVIII. THE HOOPOE.

Photographed by G. K. YEATES.

AND

THE ROLLER.

Photographed by PAUL ROSENIUS.

(Plates 15-18).

ON the present occasion we illustrate two related species of notably exotic aspect which occur as visitors to the British Isles. Occurrences of the Hoopoe (*Upupa epops*) in the southern counties are sufficiently frequent, more particularly in spring, for the bird to be considered a regular passage-migrant in quite small numbers, and instances of breeding have been recorded occasionally. Though it is still no very great rarity its visits are a good deal less frequent than formerly, as was clearly demonstrated by an analysis of records by W. E. Glegg published in the *Ibis* for 1942, pp. 390-434, and this has been correlated with a marked decrease which seems to have been general in north-west Europe. In 1948, however, decidedly more Hoopoes were reported than has been usual in recent years, as recorded on p. 89 of the present issue, and this gives Mr. Yeates's photographs an added topicality. They were taken at a nesting hole in the Camargue (Rhône delta) in April, 1937.

The Roller (*Coracias garrulus*) is a species probably associated in the minds of most ornithologists with the Mediterranean and the warmer countries, but it ranges as far north as southern Sweden, where our photograph was taken. The Roller has also markedly decreased in the north-western part of its range; it formerly bred in a number of localities in Sweden, but has steadily decreased in the past century and probably now no longer breeds on the mainland, being reduced to a few pairs in Gotland in the Baltic. It has been suggested with much probability that this change has been dependent upon a trend which has been demonstrated in north-western Europe towards a more maritime type of climate, with increased summer rainfall, which might be expected to react unfavourably on the food supply of birds feeding largely on such insects as beetles and grasshoppers. At the same time an increase and extension of range northwards has taken place further to the east in the Baltic States and Russia.

In northern and middle Europe the Roller normally breeds in holes in trees, utilizing especially old nest-holes of the Black Woodpecker (*Dryocopus martius*), but in the south it often uses holes in banks or in ruins, old walls, etc. So far as we are aware Mr. Rosenius is the only ornithologist who has photographed this species.

B.W.T.



HOOPOE (*Upupa epops*) AT NEST HOLE, CAMARGUE, APRIL, 1937.

(Photographed by G. K. Yeates.)



HOOPOE (*Upupa epops*) AT NEST HOLE, CAMARGUE, APRIL, 1937.
(Photographed by G. K. Yeates.)



HOOPOE (*Upupa epops*) AT NEST HOLE, CAMARGUE, APRIL, 1937.
(Photographed by G. K. Yeates.)



ROLLER (*Coracias gerrulus*) AT NEST, GÖINGEHOLM, SCANIA, SWEDEN,
JULY, 1924.

(Photographed by Paul Rosenius.)

THE INDEX OF HERON POPULATION, 1948.

BY

W. B. ALEXANDER.

THE number of heronries on which reports for 1948 were received at the Edward Grey Institute was 146 or 12 less than in the previous year. Of these 112 were in England, 7 each in Wales and Scotland and 20 in Ireland. We are indebted to 77 informants of whom a number have collected information from friends and correspondents. The Rev. P. G. Kennedy has supplied figures for 15 heronries in 7 counties of Eire, R. A. Hinde for 11 in Norfolk and Cambridgeshire, R. Chislett for 7 in Yorkshire and G. W. Temperley for 6 in Northumberland and Durham.

Particulars of all known heronries in the region have again been sent by A. W. Boyd for Cheshire and South Lancashire, C. A. Norris for Warwickshire and G. des Forges for Sussex, also by C. F. Tebbutt for Huntingdonshire and K. Piercy for Bedfordshire. With the assistance of members of the Oxford Ornithological Society and London Natural History Society the writer has obtained information for all but two of the known heronries in the Thames drainage area.

We have again received information about a number of heronries not previously recorded. Miss P. Lind has reported one in South Devon with 9 nests, which began with a single nest in 1943; L. P. Alder one with 12 nests in West Sussex, said to have been established in 1946; the Rev. L. Sargent one with 6 nests in East Kent, which was discovered in 1947, when it contained 11 nests; J. Knowles one with 2 or 3 nests in Hertfordshire, which formerly had as many as 5 nests; and R. W. Hale one with 2 nests in Essex, which had a single nest the previous year. D. R. Anderson has sent particulars of two heronries in Argyllshire, one with 4 nests established about 1938 and another with 6 nests said to be over 50 years old. Three others have been reported as to whose former history nothing is known: one with 3 nests in South Devon by T. M. Gullick; one with 10 nests in Co. Down by M. P. S. Irwin and one with 6 nests in Co. Tipperary by S. C. Finch-Davies.

Of the heronries counted in 1948, 123 were also counted in 1947, when they contained 1,459 nests. In 1948 these heronries contained 1,484 nests, an increase of less than 2 per cent. As the index for 1947 was 54 this gives an index for 1948 of about 55.

As explained in previous reports of this series it is considered that the most reliable index available is that based on a sample of heronries for which we have figures for one or more years when the population was normal (1928, 1936, 1937, 1938 and 1939). Of the heronries counted in 1948, 111 come into this category. The average number of nests in these in normal years was 2,499, but in 1948, they contained only 1,422, giving an index of 57. The 1947 index on this basis was 54, so that the increase was between 5 and 6 per cent.

It will be recalled that in previous years when the index has fallen after a severe winter there has been a rapid recovery after the first mild winter and within a few years the population has returned to normal unless another severe winter has intervened. The winter of 1947-8 was an unusually mild one. The mean temperature of the coldest month (February) at Norwich, as Mr. J. H. Willis kindly informs us, was 40.2°F, no less than 12° higher than the mean for February 1947. Nevertheless as we have seen there has been only a slight increase in the breeding population of Herons (*Ardea cinerea*).

The explanation of this result is probably to be found in the fact that Herons do not breed till they are two years old, so that, in a year when there is an increase, there must be more second-year birds breeding for the first time than the number of older birds which have died since the previous breeding season. In other words the increase comes from birds which have survived two winters. After a moderately hard winter when the population has been somewhat reduced it would seem that lack of competition in the succeeding winter, if it is mild, enables a higher proportion of young birds to survive their second winter. But in an exceptionally severe winter, such as that of 1946-7, when nearly half the population of mature birds succumbed, it is probable that almost all the birds of the year will perish. In that case, however favourable the following winter may be, there may not be enough young birds left to compensate for the loss among mature birds. It would seem that in fact, on this occasion, just enough survived to replace losses but not sufficient to increase the breeding population materially.

The following table gives separately the figures for each district where several sample heronries (containing in all at least 100 nests) were counted both in 1947 and 1948 and indicates that there was no considerable increase in any part of the British Isles:—

	No. of heronries.	No. of nests.		Percentage change.
		1947.	1948.	
South-west England ...	11	142	143	+1
South-east England ...	15	362	330	-9
Thames Drainage Area	17	236	257	+9
East England ...	22	195	205	+5
Midlands ...	15	165	183	+11
North-West England	9	127	135	+6
Ireland ...	16	119	112	-6
<hr/>				
England and Wales ...	102	1,325	1,351	+2
British Isles ...	123	1,459	1,484	+2

The figures for areas where all known heronries have been counted also reveal little change in 1948 as compared with 1947 and in most cases indicate that the population is much below that of the normal years 1939 and 1928:—

Area					1948	1947	1939	1928
Sussex	...	...	...	nests	136	157	280	302
				heronries	8	10	14	8
Lower Thames	...	...	...	nests	132	127	143	128
				heronries	7	7	6	8
Upper Thames	...	...	...	nests	128	109	149	150
				heronries	10	10	9	7
Bedfordshire and Huntingdonshire	...	...	...	nests	42**	36*		40*
				heronries	6	6		5
Warwickshire	...	...	...	nests	37	29		56
				heronries	5	4		4
Cheshire and South Lancashire	...	...	...	nests	116	104*	267	170
				heronries	7	8	8	6
Yorkshire	...	...	...	nests	49	56	126	91
				heronries	6	7	8	9

*=Isolated nest, included in total, not counted as a heronry.

NOTES.—Lower Thames includes heronries in the Thames Valley from the Roding Valley up to Maidenhead, excluding Gatton Park, Surrey, and Virginia Water. Upper Thames includes heronries in the Thames Valley above Maidenhead, excluding Savernake, Wilts. From the Yorkshire total the figures for Bolton-in-Bowland in Ribblesdale, and for Gilling and Scampston in the Vale of Pickering are excluded. In each case the reason for exclusion is that figures are not available for either 1948 or 1947, but the area included is continuous.

In conclusion we must again thank the numerous correspondents without whose help this report could not have been prepared. As has been pointed out above, the figures for 1949 will be of exceptional interest in showing how recovery takes place after the excessive decrease in 1947, and we would therefore ask as many readers as possible to count heronries in the coming spring (if possible between April 15 and May 10) and to send the results as soon as possible to the writer at the Edward Grey Institute, 91, Banbury Road, Oxford.

NOTES.

"ANTING" BY ROOK.

IN view of recent notes on the practice of "anting" by several species of birds the following account of what was evidently an instance of this behaviour on the part of a Rook (*Corvus frugilegus*) seems to be worthy of report.

On June 17th, 1948, a few Rooks and Jackdaws (*Corvus monedula*) were feeding in a field near Wantage. Of two adult Rooks feeding together one appeared to feed at one particular spot and to carry out what at first was thought to be preening at regular intervals. When I put the glasses on the bird it was clearly seen to peck on the ground and then rub its beak in the wing and neck feathers. It did this deliberately several times, but the second bird walked about feeding normally. The birds were disturbed and on going to the spot I found that a nest of ants of the red-brown species had been disturbed and a considerable number were still milling around on the displaced earth

BERTRAM M. A. CHAPPELL.

PRESUMED BIGAMY OF ROOK.

THE interesting observations described by R. G. Adams and R. J. Lye under this heading (*antea*, Vol. xli, pp. 210-211) can be augmented by my own made in the spring of 1948.

Five Rooks (*Corvus frugilegus*) were in a field beneath a small rookery near Bicester, Oxon, two feeding in the lower part some distance away and three quite near to my parked car. Coition took place between two of these three birds and the female then flew up to the rookery. A minute or so after the male displayed to the third bird, which was gathering nesting material, and attempted coition. The male then walked round the female and coition took place. No other Rook was seen to fly into or out of the field and the four remained until disturbed by a farmer entering the field with a cart.

Also on one occasion two sitting birds in nests about 3 feet apart in a small rookery near my home in Cowley were visited almost simultaneously by one bird. It was clearly seen to feed one sitting bird. I could not be sure of the first bird visited being fed, but all the actions led me to believe this was the case; each sitting bird greeted the visitor in the usual manner.

BERTRAM M. A. CHAPPELL.

COURTSHIP FEEDING OF HAWFINCH.

THE description in *British Birds*, Vol. xli, pp. 211-212 of courtship feeding in the Hawfinch (*Coccothraustes coccothraustes*) agrees well with similar behaviour I witnessed on May 11th, 1947, near a nest of this species on Wimbledon Common, Surrey. Attention was attracted by the continuous sharp "zit-zit-zit" of the female in the tree-tops. On the male approaching with food the female

crouched with shivering wings like a young bird; the male fed her and she then flew after him into the neighbouring trees. Two days later she was sitting on the nest. R. W. HAYMAN.

IN this connexion (*antea*, Vol. xli, p. 211) I saw a male Hawfinch (*Coccothraustes coccothraustes*) feeding its mate on wych-elm seeds on May 1st and 2nd, 1948, one or both calling incessantly a sharp shrill "si" repeated quickly, when the female, with a queer fluttering flight, went on to the nest in a tall larch close by.

H. G. ATTLEE.

SONG OF SERIN.

ACCORDING to *The Handbook*, Vol. 1, p. 82, the song of the Serin (*Serinus serinus*) is "delivered from tree, commonly at fair height (c. 30 feet upwards), or telegraph-wire, or in nuptial flight." In the Lebanon I found that the bird sang on the ground, from a rock, from a wall, from a wire fence and from the top of a small tree. On one occasion it was singing from a rock projecting above the snow at 4,000 feet. E. M. CAWKELL.

HOUSE-SPARROWS FEEDING ON DRAGONFLIES.

ON May 11th, 1947, at Hastings I observed several female House-Sparrows (*Passer domesticus*) at the edge of a small pond where the early Aeschnid dragonfly *Brachytron pratense* was emerging; soon one flew off with a *pratense* in its beak, and they were evidently searching them out in the herbage when I intervened.

In May 1930, House-Sparrows were seen to sally out from trees at a pond in Bushey Park, to take teneral (immature) Agrionid dragonflies (*Ischnura elegans*) as they rose into the air after emergence.

Attempts to take *mature* large species, such as *Libellula depressa*, seem quite futile usually. H. G. ATTLEE.

CRESTED LARK IMITATING RED-WATTLED LAPWINGS.

MESSRS. Barrett, Conder and Thompson's paper "Some Notes on the Crested Lark (*antea*, Vol. xli, pp. 162-166) recalled a Crested Lark (*Galerida cristata*) that frequented the vicinity of my tent in a camp near Baghdad, Iraq, in the spring and early summer of 1920. My original notes were lost during the Arab rebellion later that summer, but I have a short note made the following winter. This Crested Lark included as a regular feature of its song a dramatic imitation of a pair of Red-wattled Lapwings (*Lobivanellus indicus*) disturbed in their breeding territory. It was an elaborate performance reproducing exactly the increase and easing of excitement normally shown by that species in its nesting area. There was a pair of Red-wattled Lapwings some 200 to 300 yards away, and audible in camp. I cannot say over what period this imitation was made, but it was frequent at least for some weeks, and throughout the greater part of May. It was often delivered from the ropes of my tent during the hottest hours of the afternoon.

It was so well done that one could almost see the Red-wattled Lapwings flying round and tumbling about in the air as their excitement became more intense.

T. A. W. DAVIS.

VARIANT YELLOW WAGTAIL BREEDING IN CHESHIRE.

ON June 12th, 1948, whilst in the hills near Higher Disley, Cheshire, I saw a cock Yellow Wagtail whose head plumage was obviously abnormal. He was gathering food in a clearing in a small wood, and in good light, using 9 x 35 binoculars at 20 yards distance, I was able to note the following details. Forehead, crown and nape a lavender colour. Lores almost black, but ear coverts practically the same colour as the crown. The lavender-blue of the head ran well down on to the hind neck. The most striking feature was the complete absence of any superciliary stripe, either before or behind the eye, nor was there any sign of a white line running beneath the lores and ear-coverts, such as occurs in the Blue-headed Wagtail (*M. f. flava*). The belly, breast and throat were yellow, but the chin was grey-buff. In wings, mantle and tail the bird resembled a Yellow Wagtail (*M. f. flavissima*).

Later the hen arrived and also gathered food. She was a particularly poor specimen, and, like some hen Yellow Wagtails in their first breeding-season, resembled an immature bird. She showed no yellow on the breast, but had a slight area of very pale yellow on each side of the rear under-belly. The throat and breast were a dirty buff, and a broken rudimentary band of brown ran across the upper breast. The chin was grey-buff and there was a yellowish-buff eye-stripe of the usual *flavissima* type.

The birds were picking up larvæ of the *Tortrix* moth which were infesting several oak trees, and the nest was finally located in a field of mowing grass about a mile away. The altitude was 750 feet above sea level.

It is interesting to note that R. B. Sibson (*North-Western Naturalist* 1945, p. 251) saw a similar bird near Sandbach, Cheshire, on June 29th, 1938, which had a head showing a "fine purplish gloss when the light struck it", but no eye-stripe, though there was a dab of white behind the eye. The lores of this bird were also dark. This cock bird was displaying to a hen, and its presence in a place within 30 miles of this year's bird may not be without significance.

On June 15th I took W. Ramsden up to see the birds. They were still feeding the young and he was able to get views of both birds, though on this particular evening the light was poor. His own notes are appended to this account.

STUART SMITH.

I was with Stuart Smith at Higher Disley on Tuesday, June 15th, and returned there on June 17th for a further view of the wagtails.

On the 17th I was there a little earlier in the evening and in a very much better light, with occasional gleams of sunshine, had excellent views of the cock bird through 8 x 40 binoculars at about 15 yards range.

I concur with Smith's description of both birds except that, to me, the blue-grey head of the male seemed very pale and there appeared to be no sharp demarcation between the blue-grey on the face and the rather dirty white of the chin—just a gradual shading. At times I thought I could make out a very small dot of white immediately behind the eye, but could not be absolutely certain.

W. RAMSDEN.

PIED WAGTAIL FEEDING YOUNG ON FISH.

THE observation by Kenneth Brown (*antea*, Vol. xli, p. 214) may be supplemented by my own observations made also in June, 1946, at Sandford-on-Thames, Oxon.

Several boys had taken a number of very small fish from the river with small nets and had thrown them on the river bank. A pair of Pied Wagtails (*Motacilla alba yarrellii*) which had a nest in the buildings of a paper mill close by were seen to visit the spot after the boys had gone and feed upon the unidentified fish, which were about an inch and a half in length. One bird made several visits to this spot in a short space of time and flew to the buildings with the fish presumably to feed the young.

The brood of four youngsters and the adults were seen a few days later.

BERTRAM M. A. CHAPPELL.

POLYGAMY IN SPOTTED FLYCATCHER.

A pair of Spotted Flycatchers (*Muscicapa striata*) started a nest on my house at Headley Down, Hants. This was abandoned and a new nest made in a nest-box 20 yards away from the former site. Incubation started on May 31st, 1948.

Another hen now appeared and completed the nest on the house, and incubation started on June 9th. The one cock was in attendance on both hens, and his normal perch was mid-way between the nests. The second hen was killed by a cat just before the eggs were due to hatch.

H. T. GOSNELL.

"INJURY-FEIGNING" BY REED-WARBLER.

KEEPING observation on several nests of the Reed-Warbler (*Acrocephalus scirpaceus*) I observed a display of "injury-feigning" by a female on July 9th, 1948, at Cassington, Oxon.

As I approached a nest, which had contained two young, both adults uttered the alarm calls and as I got near the female remained quite close to me still calling, but the male broke away to a greater distance over the water and sang vehemently in almost unbroken song, whilst I was at or near the nest. The young had left the nest and were heard calling near by and when I pulled the reeds apart to find them the female fluttered through the reeds about me in a helpless manner or as a youngster would if unable to fly. When I picked one of the young from the reeds to examine it, it called loudly; the female then flew up on the reeds close by my head and fluttered on to the path bordering the pond and along it for some distance with both wings outspread, dragging them in turn, and finally flew up into the reeds calling the while. When I

released the youngster both adults flew near to it and encouraged it through the reeds and over the water.

This particular brood of young fledged at nine days and they could only fly a few yards when the incident above described occurred.

BERTRAM M. A. CHAPPELL.

[Mr. P. E. Brown, who has studied Reed-Warblers very extensively, informs us that he has never observed comparable behaviour, so that it is evidently quite exceptional.—EDS.]

BLACKBIRDS, SONG-THRUSHES AND STARLINGS TAKING HAIRY CATERPILLARS.

DURING June, 1948, Mr. L. Birch and Mr. G. P. Sutton, of Birmingham, were feeding up the hairy caterpillars of the Garden Tiger (*Arctia caja*). They both report from separate areas that Blackbirds (*Turdus merula*), Song-Thrushes (*Turdus ericetorum*) and Starlings (*Sturnus vulgaris*) were seen to search for and take the caterpillars with such persistence that they have become a considerable nuisance. The Blackbirds and Song-Thrushes were seen by Mr. L. Birch to take the caterpillars to their young in nests near by. The birds were first seen to take dead caterpillars which had been thrown away on the ground. They then began to take the live ones with great eagerness whenever they could get to them. The caterpillars were broken, and mushed up on the ground before being eaten or taken to the young.

These large and hairy caterpillars are not usually reported as being taken by the above species.

EILEEN M. BUTLER AND F. FINCHER.

PERSISTENCE OF BEHAVIOUR DUE TO HABIT- FORMATION IN ROBIN AND JACKDAW.

D. J. May (*antea*, Vol. xli, p. 119) refers to habit-persistence in the Chiffchaff (*Phylloscopus collybita*), Swallow (*Hirundo rustica*) and Blackbird (*Turdus merula*), in showing alarm when their nests were approached after their young had flown.

On May 8th, 1948, I noted similar behaviour in a Robin (*Erithacus rubecula*), which had its nest in a hole in an oak some fifteen feet from the ground. This bird had become accustomed to return to its nest as soon as the ladder had been removed. When I inspected the nest two or three days after the young had flown, one of the adults gave its alarm call and visited the nest as soon as the ladder was moved.

Also, on May 16th, 1948, a Jackdaw (*Corvus monedula*) was seen to enter its nesting-hole twice in the evening, after the young had flown in the morning.

JOHN M. McMECKING.

HOUSE-MARTINS FEEDING AT NIGHT.

AT 2 a.m. G.M.T. on July 2nd, 1948, while on guard at the North Airfield, Cranwell, Lincs., I found a large party of House-Martins (*Delichon urbica*) feeding on small moths. At the time it was very dark, so dark that the birds could not be seen when only a few feet away.

M. J. ARDLEY.

HOOPOES IN ENGLAND IN 1948.

In general we do not regard occurrences of Hoopoes (*Upupa epops*) in England as sufficiently unusual to record specially in *British Birds*, such occurrences being more appropriately dealt with in the numerous local reports which are now published. It is, however, clear from information received that the number of these birds observed in the South of England in the spring and summer of 1948 was unusual, so that it seems worth while to summarize these. The records received up to date are listed below and we shall be glad to hear of any others which have not already been reported to us.

DEVON.—One at Pounds Hemyock, May 13th (R. Pooley, *per* City Museum, Bristol and H. H. Davis).

SOMERSET.—One on lawn at Barley Wood, Wrington for about 10 days from July 23rd (Douglas W. Wills, *Field*, Aug. 28, 1948).

One on roadside at Ubley, July 28th (Alfred Shaw *per* H. H. Davis).

HAMPSHIRE.—One watched by roadside near Lymington, May 15th (E. Cohen).

SUSSEX.—One observed on the Sussex Downs on April 17th (J. S. Wightman). An excellent view obtained of one on the downs near Portslade in the early evening of July 25th. The bird was travelling due south at a height of 12-15 feet, with the characteristic dipping flight but nevertheless in a direct and purposeful manner, as though making for the coast about 3 miles distant (C. F. Brown).

SURREY.—One watched on July 30th feeding on ants on a lawn at Chipstead, where it had been reported on the previous day (L. I. Carrington and B. Wood).

ESSEX.—One watched in the garden of Coptfold Hall, Margareting, on April 27th (Mrs. P. V. Upton).

BERKSHIRE.—One seen feeding on ants on a lawn at Bucklebury on July 28th (G. Brown).

GLOUCESTERSHIRE.—One seen on lawn at Manor House, Wotton-under-Edge, July 29th to August 5th (Reported in local press by G. A. K. Hutton). One on a lawn near Stinchcombe for a short time on August 13th (Reported *per* H. H. Davis by Miss E. D. Overend, who did not see the bird herself, but is fully satisfied as to its identity). One frequented the garden of the Grove, Taynton, for some days in August, being first seen about five days prior to August 23rd. It had not been observed previously (M. Philips Price).

THE EDITORS.

TAWNY OWL AND RED SQUIRREL.

ON July 15th, 1948, when looking at some nest-boxes in a 22-year-old Scots pine plantation about six miles west of Perth, I found on a ride a patch of grass about 18 inches by 12 inches flattened and turning brown. At one end of it were the remains of a Red Squirrel (*Sciurus vulgaris*) identified by the skull and the long red tail hair, at the other a partly decayed Tawny Owl (*Strix aluco*). This identification has kindly been confirmed by Mr. J. D. Macdonald, from the skull and a much battered wing. One foot of the owl with the claws clenched was lying amongst the squirrel remains, apparently chewed off near the top of the tarsus. There was some heather on the edge of the flattened grass with two or three quite sizeable branches dry and stripped of all green. The two animals had been dead about a week when found.

It is surmised that the owl caught the squirrel, which promptly attacked and killed it after a fight, witness the heather and dead grass. The squirrel then chewed off the foot which held it before dying itself, as it was about a foot from the owl.

I have been told of a similar find in a citrus grove belonging to the B.S.A. Company near Salisbury, Rhodesia. A big hawk and a fruit bat were lying dead, the hawk's claws fixed in the bat, and the bat's teeth in the hawk's throat. This was five or six years ago.

J. M. D. MACKENZIE.

NESTING SITES AND LOCAL CONCENTRATION OF KESTRELS.

ALTHOUGH *The Handbook* mentions hole-nesting in trees by the Kestrel (*Falco tinnunculus*) as only an occasional habit, it appears that in some areas, at least, nesting in such sites may be the usual practice. Six occupied nests found in 1948 in Richmond Park, Surrey, were all in holes in old oaks. One was in a cavity in the broken top of the main bole 40 feet up, one in a hole 20 feet up in a main trunk, and four were in cavities in split, broken off or sawn-off thick lateral branches from 30-40 feet above the ground. Four of the nesting holes which I was able to examine had a shallow depth and a flat floor of decaying wood, without nesting material of any kind.

These six nests, from which at least 26 young birds are known to have flown, were all within the circumference of a circle having a radius of $\frac{3}{8}$ ths of a mile. There seems little doubt that such a comparatively high nesting concentration is due to the exceptionally favourable conditions presented by the combination of a plentiful supply of nesting-sites with a large area of cultivation (mainly corn and potatoes) in the Park itself, with a consequent increase in the small mammal population. Before the war breeding in the Park was only once clearly proved.

R. W. HAYMAN.

KESTREL TAKING YOUNG ARCTIC TERN.

ON July 5th, 1948, whilst watching terns which were breeding on a small rocky islet off Holyhead Island, Anglesey, I observed adults chasing a Kestrel (*Falco tinnunculus*) which was carrying an object in its talons. The Kestrel landed on some rocks near by, but flew away when I approached, leaving behind the headless body of a young tern since identified by the Keeper of the Yorkshire Museum as an Arctic Tern (*Sterna macrura*).

The Handbook does not mention Kestrels taking young terns.

C. P. RAWCLIFFE.

THE SPRING MOVEMENT OF BRENT GEESE IN SUSSEX.

THE spring passage of the Brent Goose (*Branta bernicla*) off the Sussex coast is generally considered to be almost completed by the end of March (cf. J. Walpole-Bond, *A History of Sussex Birds*).

During the spring of 1948 we spent many hours, sometimes whole days, watching the sea at various points between Langney Point and Seaford Head. The movement of Brent Geese which we witnessed during this period was far greater in numbers and much longer in duration than would be expected on the basis of the particulars given in the above work. Before giving the detailed figures a few general statements are necessary. All the movement was towards the east and, when considerable numbers (fifty or more in a day) were concerned, passage was always against an easterly wind. In all cases of small numbers (up to 11 in a day) the wind was westerly. Most passage was too far out for sub-specific identification to be possible. Where this was possible, e.g., on March 28th, when a party of 80 came close in under the cliffs, all proved to be of the Dark-breasted form (*B. b. bernicla*). On some occasions passage took place, with considerable intervals, throughout the day. On others the whole passage recorded occurred in a relatively short time, sometimes in half an hour. Parties varied in size from 3 to 200 birds, 30 being a fair average for most days of considerable passage.

The numbers seen (given in round figures except in the case of passage on a small scale) were as follows:—

March 26th, 135; 27th, 55; 28th, 580; 29th, 410. All these birds were seen from the Seven Sisters and by all of us, except in the case of those seen on March 28th, when J.H.B. was absent.

April 11th, 200 off Seaford Head (J.H.B., D.D.H. and C. St. C. Simmons), and later in the day 50 passing the Seven Sisters (D.H.B.); 17th, 1,320 off the Seven Sisters and 30 off Seaford Head (D.H.B.); 18th, 6 off Seaford Head (J.H.B. and D.D.H.); 30th, 11 off Langney Point (D.D.H.).

May. On the 16th all three of us saw 80 off Beachy Head. This was the only day during this month when a regular watch was kept.

June. On the 16th D.D.H. saw a party of 6 passing off Langney Point. There appears to be no published June record for Sussex, though *The Handbook* states that the bird is exceptionally present in Britain during this month.

JEFFERY H. BOSWALL, DAVID H. BROWN, D. D. HARBER.

DIVING OF LITTLE GREBE NESTLINGS AND WARNING BEHAVIOUR OF ADULT.

The Handbook does not state at what age young Little Grebes (*Podiceps ruficollis*) begin to dive independently for food; in the case of the Great Crested Grebe (*Podiceps cristatus*) and Black-necked Grebe (*Podiceps nigricollis*) mention is made of six weeks and 17 days respectively. In the case of two young reared in Richmond Park in 1948 diving for food was first observed at about 25 days; in another brood of four nestlings reared later on the same pond independent diving for food on the part of the two largest birds was first noticed at the

approximate age of 14 days. But ability to dive in emergency is of much earlier development. On July 24th, one nestling of another brood, believed to be at the time not more than six or seven days old, was observed on open water at the same place, fifteen yards from the adjacent cover of reeds, following one of the parents, which fed it frequently. Without warning, the old bird suddenly took alarm and dived with a violent splashing, striking the water with its wings as it went under. At the same instant the young bird, then about six feet away, disappeared under water with extraordinary suddenness. A few moments later both birds emerged some yards nearer cover, and instantly the same performance was repeated. Another repetition of the same tactics brought both birds into cover and no more was seen of them, or heard, although up to the moment of alarm the young bird had been uttering continuously the wheezing hunger cry. It appears that the splashing dive, with the surface struck by the wings, is the danger signal. Some time before this incident the old bird had submerged and attacked from below an intruding Moorhen (*Gallinula chloropus*) that came too near the nestling. The Moorhen was taken by surprise and went off in great haste. On July 31st, the same emergency diving by both old birds and four young (then about 14 days old) was observed at the same place when a female Kestrel (*Falco tinnunculus*) made an unsuccessful sally from an adjacent tree.

R. W. HAYMAN.

UNUSUAL CALL-NOTE OF WHIMBREL.

On June 8th, 1948, between the Dale Roads and St. Brides Bay, Pembrokeshire, at about 7.30 p.m. B.S.T., I heard a strange chattering and on looking up saw two Whimbrels (*Numenius phaeopus*) flying northwards at a height of forty to fifty feet, evidently on migration. I watched them till they were out of sight. They kept calling to one another, one uttering the usual rippling liquid whinny, the other the chattering note that had attracted my attention. I now found that the two calls, one liquid the other harsh, though totally different in tone, were almost identical in time and cadence. The chatter had less carrying power than the whinny, as it was inaudible while the normal call was still clear. None of the notes described in *The Handbook* fits it. This occurred on a regular migration route, and during the past six weeks I had heard, and sometimes seen, Whimbrels flying over very frequently, by night as well as by day.

T. A. W. DAVIS.

COMMON SANDPIPER UTTERING SUB-SONG ON NEST.

On June 10th, 1948, I was photographing a Common Sandpiper (*Actitis hypoleucos*) from a hide at a nest on a hillside, about 100 yards from a loch near Seourie, Sutherland. On one occasion when I was in the hide, and one of the sandpipers (assumed to be the hen) was on the nest, another sandpiper began to sing (kitti-weewit) down by the loch side, as near as I could judge by

ear. Immediately the song began, the sitting bird raised her head and uttered, in unison with the singing bird, a very soft, barely audible, version of the song. The bird's throat could be clearly seen pulsating synchronously with the sound. After about a minute, the singing bird broke off, and the bird on the nest also became silent; but when a few seconds later the song began again, the sitting bird joined in and accompanied it softly as before, promptly becoming silent again when the song finally ceased after another half minute or so. A few seconds later, what was assumed to be the cock of the nesting pair appeared and took over the duty of incubation.

It is tempting to assume that the sandpiper uttering the normal song was the mate of the bird on the nest, and that the duet which took place was part of the nest relief procedure; but there must be some doubt about this, since I was unable to establish the identity of the singer, and there was another pair of sandpipers (with chicks) in the vicinity. Nevertheless the sub-song of the bird on the nest seems of interest in itself, and does not appear to have been previously described.

R. I. MORRISON.

COMMON SANDPIPER BREEDING IN ESSEX.

As Essex is not mentioned in *The Handbook* as one of the counties in which the Common Sandpiper (*Actitis hypoleucos*) has bred, it may be of interest to report that on July 20th, 1947, while walking along the sea-wall near Goldhanger I saw an adult bird of this species in close attendance on a young one about half its size. They allowed an approach to within about 10 yards. A second adult bird, presumed to be the mate of the other, was seen in the vicinity of the sea-wall, chiefly by the side of a stream which ran parallel to the wall through a fresh-water marsh. A. J. MARTIN.

KENTISH PLOVERS IN SUSSEX, S. STAFFORDSHIRE AND DEVON.

On May 3rd, 1948, a male and a female Kentish Plover (*Leucopoliuss alexandrinus*) were seen at Rye Harbour, Sussex, by J.H.B. These birds were then seen by the same observer every day up to and including May 7th. On this last date at least an attempt at coition was witnessed. On May 5th, D.D.H. also saw the birds. On May 8th and 12th, very careful search failed to disclose the presence of the birds and it is probable that they had passed on. On May 17th, a female was seen in the above locality by all three of us. It was not found by D.D.H. on May 19th, but either it or another female was seen there by D.H.B. on May 22nd. Finally, on May 26th, D.D.H. found that two males and a female were present. The area was again visited on May 29th and on subsequent dates, but no more Kentish Plovers were seen. Thus, on the assumption that the pair first observed had left by May 8th, at least five Kentish Plovers visited the area on spring passage.

Serious consideration was given to the possibility that a pair might be nesting, but very thorough search on a number of occasions failed to disclose any sign of this.

Many splendid views of the birds were obtained by all three of us and all the field-characters given in *The Handbook* were clearly distinguished; the small size as compared with Ringed Plovers (*Charadrius h. hiaticula*), many of which were present for comparison; the blackish bill and legs; the absence of a pectoral band and its replacement by patches at the sides of the breast, these being almost black in the male and brownish in the female; the dark mark above the forehead and through the eye of the male; the brownish mark through the eye of the female; the white line over the eye; the reddish tinge of the crown of the male.

In addition, however, we were struck by another field-character which is not mentioned in *The Handbook*—the more sandy coloration of the upper-parts as compared with those of the Ringed Plover. This difference appeared quite striking under some conditions.

JEFFERY H. BOSWALL, DAVID H. BROWN, AND D. D. HARBER.

ON May 2nd, 1948, an adult male Kentish Plover (*Leucopolijs alexandrinus*) were seen at Bellfields Reservoir by Capt. I. A. Beddows, A. W. Wolton and M. J. Rogers together and earlier in the day by C. L. Taylor. The bird was seen in a good light and on one occasion for a long period, through binoculars and telescopes at ranges down to about 50 yards. Features observed include the following: Legs, lead-grey. Bill, dark. Band through eye, narrow, blackish. Nape and, less noticeably, crown, definitely more rufous than back. Pectoral band, blackish, interrupted by wide (white) gap in front. Upper-parts of body, light, sandy. Tail in flight, very noticeable white bar down each side. Note, triple.

M. J. ROGERS, C. L. TAYLOR, A. W. WOLTON, I. A. BEDDOWS.
ON May 23rd, 1948, while I was watching Ringed Plover (*Charadrius hiaticula*) on the Exe estuary two alighted near me, accompanied by another bird which I instantly recognized as a Kentish Plover (*Leucopolijs alexandrinus*). At closer quarters I saw it was a female, there being no dark patch on the forehead. Apart from being much smaller than its companions it was decidedly paler, more so, it seemed, than the Kentish Plover seen on several occasions earlier in the year (*antea*, p. 249), although it is possible it was the same individual. Other points noticed were the black beak and feet, the patch on each side of the breast, the narrow white stripe on each wing when open and the sharp "wheet" uttered in flight. R. G. ADAMS.

PATTERING ACTION OF LAPWING.

ON June 12th, 1948, whilst I was bird-watching at the West Stow sewage farm, Suffolk, a Lapwing (*Vanellus vanellus*), which had been circling and crying over me, settled on a partly

dried sewage bed and was noticed to give a fast vibratory movement of a forwardly raised leg. The leg whilst vibrating, was noticed to be just above, and never came into contact with, the ground. The bird was about 50 feet away, in bright sunlight and was viewed through 6 x binoculars. Other recent references to this behaviour (*antea*, Vol. xI, pp. 125 and 349) have stated that the birds were feeding, which the one I observed certainly was not doing, and it seems worth emphasizing the fact that the foot in this case did not touch the ground at all. JOHN DENNY.

TUMBLING FLIGHT OF AVOCET.

In July and August, 1939, at the Midrips in Sussex I had under observation for sixteen days two immature Avocets (*Recurvirostra avoetia*). On one occasion on August 5th they were seen to rise in the air and fly round very rapidly tumbling much as does a Lapwing (*V. vanellus*) in display-flight, but much faster. On this date there was an abnormal number of flying insects over the water, which were attracting several *Hirundinidae*. The Avocets were seen to cease feeding several times in order to pick off insects and it seems possible that the evolutions described had also the object of getting rid of insects. E. M. CAWKELL.

GLAUCOUS GULL DIVING FOR FOOD.

In view of recent references to Great Black-backed Gulls (*Larus marinus*) diving for food (*antea*, Vol. xli, p. 93) it may be of interest to record diving by the Glaucous Gull (*L. hyperboreus*).

On February 16th, 1947, I watched an immature Glaucous Gull diving in about 3 feet of water at Princes Park, Eastbourne. It employed two methods: (a) By swimming on the surface and leaping about 3 feet into the air and diving, immersing body and part of the wings; this it did a number of times. (b) By flying about 6 feet above the water and diving, leaving only the extreme wing-tips visible. I saw it do this only twice.

In all cases the bird remained on the water for a short time after surfacing, usually in order to swallow its catch. DAVID H. BROWN.

DISPLAY OF KITTIWAKE.

On June 21st, 1947, at Langney Point, Eastbourne, I saw a flock of about 60 Kittiwakes (*Rissa tridactyla*) some of which were displaying. Some were seen to face each other with open bills, "kittiwaking" (cf. *antea*, Vol. xli, p. 32).

Another type of display was noticed, of a kind not recorded in *The Handbook*. An immature bird was seen to pick up a piece of seaweed and parade before an adult, apparently "offering" it the seaweed. The adult bird appeared indifferent to this behaviour, and the immature dropped the weed. Later, I saw an adult offer seaweed to an immature bird, which ignored it. The adult then flew with the same piece of seaweed to three other immature birds in turn, all of which failed to respond in any way. The seaweed was then dropped. DAVID H. BROWN.

BLACK GUILLEMOTS ON NORFOLK COAST IN SUMMER.

On the afternoon of June 6th, 1948, while watching Fulmars (*Fulmarus glacialis*) on the cliffs at Weyburn, Norfolk, I saw a pair of Black Guillemots (*Uria grylle*) flying low over the sea, about 100 yards out, and in a N-N.W. direction, following, apparently, the coastline. Through x 8 binoculars their white wing patch on black made identification a certainty, especially as I am familiar with the bird in the Shetlands.

It appears from *The Handbook* that Norfolk is very far south for the bird, at this time of year. ROBERT GERARD.

[B. B. Rivière (*A History of the Birds of Norfolk*, 1930) mentions that Black Guillemots have been recorded on the Norfolk coast as late as April, but a June occurrence is undoubtedly highly unusual.—EDS.]

REVIEW.

Bird Display and Behaviour: An Introduction to the Study of Bird Psychology. By Edward A. Armstrong. (Lindsay Drummond, 1947). 21s.

The first edition of Mr. Armstrong's book, published in 1942 under the title *Bird Display*, was reviewed in *Brit. Birds*, vol. xxxviii, p. 20. The present edition has been extensively revised and enlarged and the amplified title sufficiently indicates its scope. The book continues to be primarily concerned with the more formalized kinds of behaviour occurring in birds, but these cannot of course be isolated from the behaviour as a whole, and the treatment is comprehensive enough to include useful discussions of such topics as territorial activities and song, which are rightly recognized as so closely interrelated with the main theme as to deserve discussion in relation to it. It will thus assuredly provide in its new form, as indeed it did in the old, a valuable 'Introduction to Bird Psychology' for many who would otherwise probably never have got to grips with the subject, while the very full bibliography provides a useful source of original references even for the more experienced. The somewhat expanded scope of the work increases its value. Many references to important Continental work during the war years have been incorporated, as well as new material from British sources. The complete sections which are mainly new include discussions of displacement activities and social facilitation; the chapters on the comparative study of display forms and the "social hierarchy" in bird life have been notably enlarged, and the chapter entitled "Territory, Song and Song-flight" in the first edition has been expanded into two. Some useful text-figures illustrating postures have been added and the number of photographs increased. All these changes are improvements. On the other hand, as at least one reviewer has indicated already, the author's commendable desire for thoroughness on the factual side results in considerable parts of the book being so much a mere catalogue that the reader is liable to lose the main thread in a plethora of examples. A certain judicious pruning of these might have been an actual advantage, especially if correspondingly more space had been allowed for discussion and interpretation, which is not invariably followed out so far as it might be.

This is not, however, a major, though we believe it to be a valid, criticism. *Bird Display* has already achieved an honourable position amongst British works on birds and the present edition, even more than its predecessor, is a mine of information about bird behaviour much of which is not obtainable in any other book. It can hardly fail to stimulate closer and more critical attention to behaviour on the part of amateur observers.

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NEST RECORDS OF THE SONG-THRUSH*

BY

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INTRODUCTION.

THE British Trust for Ornithology Hatching and Fledging Cards, now called Nest Record Cards, were originally designed by Dr. Julian Huxley and Mr. James Fisher. Members of the Trust are asked to complete a card for every nest of every species that they find, giving details of locality, situation, number of eggs, young, etc., with dates. The completed cards are sent in at the end of each nesting-season and are deposited at the Edward Grey Institute. The cards for the Song-Thrush (*Turdus ericetorum*) have been analysed in this paper.

This method of enquiry represents a valuable advance in field ornithological technique. It is a simple matter for every ornithologist to write on a card details of each nest that he finds, and though such observations would have no value in isolation, their sum provides an impressive body of data. To take one simple example, before 1947 there were only about 25 published records of the nestling period of the Song-Thrush, but 173 records have been summarized here from the Nest Record Cards. Unfortunately many of the cards have rather ambiguous entries, so had to be omitted from some of the analyses. In addition, some contributors have an irresistible desire to infer details which they did not actually observe. For instance, a nest found with three chicks and an infertile egg has sometimes been recorded as a clutch of four eggs, although it might easily have been a clutch of five which had lost an egg or chick before the observer found it. A new card has recently been designed, which it is hoped will overcome such difficulties.

By the end of 1947, 484 cards had been filled in for the Song-Thrush. In addition, Mr. A. Whitaker has presented to the Edward Grey Institute a copy of his nest records for the last 48 years, and his data on 464 nests of the Song-Thrush have been incorporated. Owing to the kindness of Dr. H. N. Kluijver, some data on clutch-size of the Song-Thrush in Holland were also available. Finally, data on brood-size were obtained from the British Trust for Ornithology Bird Marking Scheme, and I am indebted to Miss Leach for allowing me to analyse the data from the ringing schedules.

*Publication of the British Trust for Ornithology.

BREEDING-SEASON.

The date on which each clutch was completed has been used for analysing the breeding-season of the Song-Thrush in Britain. This date does not always appear on the card, but it can be calculated with sufficient accuracy from the date of laying of the first egg, or of the hatching of the young, when this has been recorded. For nests found during incubation for which no other date was available, six days were deducted from the date of finding, on the presumption that on the average a nest is found about half-way through incubation. For Mr. Whitaker's nests the problem is easier, as he states the approximate degree of incubation of each clutch, and these notes were used to estimate the approximate date of laying. As the results have been grouped in seven-day periods, an error of a day or two either way is unlikely to make any appreciable difference.

TABLE I.—APPARENT BREEDING-SEASON.

			<i>North</i>	<i>South</i>
<i>Clutch completed</i>			<i>England</i>	<i>England</i>
March	4-10	...		1
	11-17	...	1	
	18-24	...	4	6
	25-31	...	27	22
April	1-7	...	64	33
	8-14	...	62	13
	15-21	...	92	26
	22-28	...	49	24
April 29-May 5		...	36	27
May	6-12	...	48	47
	13-19	...	30	18
	20-26	...	17	15
May 27-June 2		...	25	16
June	3-9	...	22	6
	10-16	...	15	15
	17-23	...	9	4
	24-30	...	6	5
July	1-7	...	9	1
	8-14	...	5	1
	15-21	...		1
August	6 ...	...		1
Total	...	...	521	282

The data in Table I show that the usual laying period of the Song-Thrush in Britain is from the middle of March to the middle of July, and that as many as 72% of the recorded clutches were laid in April and the first half of May. It must be pointed out, however, that the dates appearing in Table I probably do not give an altogether accurate sample of the bird's breeding-season. Nests of the

Song-Thrush are much more conspicuous early in the year, before the leaves are out, than later in the season. Also, observers tend to look for nests with greater zeal early in the season, so that late nests of the Song-Thrush may be overlooked. The school term (May-July) and holidays (April) markedly affect the activity of some observers.

For Table I, England was divided into "north" and "south" by a line from the Wash to the Mersey along the southern boundaries of Lincoln, Derby, Notts and Cheshire. Mr. Whitaker's records from the borders of Derbyshire and Yorkshire provided most of the data for the North. Wales has been omitted. It will be noticed that two peaks appear in the breeding-season of each region. In the south, these perhaps indicate the times of the first and second broods. In the north, the first peak occurs about two weeks later in the season than in the south. The second peak is less clearly marked than in the south, and is too close to the first peak to indicate second broods; hence its significance is obscure. Data from Holland, shown in the totals column of Table III, give only a single peak, which occurs April 20th-29th. This suggests that the double peaks appearing in the English data may be false.

It is almost certain that there are annual variations in the breeding-season of the Song-Thrush, breeding starting later in a cold than in a warm spring. Unfortunately there are not enough data to test for this from the cards.

CLUTCH-SIZE.

To determine clutch-size, only those clutches known to be complete have been counted. This meant that many cards had to be rejected. For example, a single entry on a card of a nest found with four eggs, and with no evidence given of subsequent visits by the observer until the nest was found destroyed, cannot certainly be included as a genuine c/4; it might have been an incomplete c/5. This principle was adhered to throughout.

Parkhurst and Lack (1946) found that in the Yellowhammer (*Emberiza citrinella*) nests found during the course of incubation had a slightly lower average clutch-size than those found before or at the time of completion of the clutch, presumably because the former had been subject to some losses due to predation before they were found. However, in the present Song-Thrush data, the average clutch-size of nests found (i) at clutch completion and (ii) after incubation had started was not significantly different. (Indeed by chance, the former actually had a slightly lower average than the latter, 4.12 eggs as compared to 4.26 eggs.) Hence the data for all nests found with eggs were combined.

In the Song-Thrush in Britain, the great predominance of clutches of four and five eggs will be noticed in Table II. Clutches of three eggs form only 9%, and clutches of one, two and six eggs only 1% of the total.

SEASONAL VARIATION.

Seasonal variation in clutch-size occurs in many species (Lack, 1947). The Robin (*Erithacus rubecula*) (Lack, 1948), the Yellowhammer (Parkhurst and Lack, 1946) and the Blackbird (*Turdus merula*) (Fisher, in press) have been analysed in detail. In these species, the average clutch-size at the start of the breeding-season is usually small. It increases to a peak, usually occurring in May, and decreases again later. The data for the Song-Thrush in Britain in Table II show a similar rise from an average clutch-size of 4.0 eggs in April to 4.4 in May, and down to 4.0 again in June.

The data on the clutch-size of the Song-Thrush in Holland were recorded somewhat differently from those in Britain, being dated from the laying of the first egg; and they have been analysed in ten-day periods. However, the figures in Table III are approximately comparable to those for Britain, the average clutch-size rising from 4.16 during most of April to 4.51 in May, and falling again to 4.18 in June. Some data are also available from Finland (Siivonen, 1939) and are shown in the last column of Table V. The Finnish data show a summer peak of 4.76 eggs in the average clutch-size, but there it occurs in June instead of May. (Unfortunately Siivonen did his analysis only by months.)

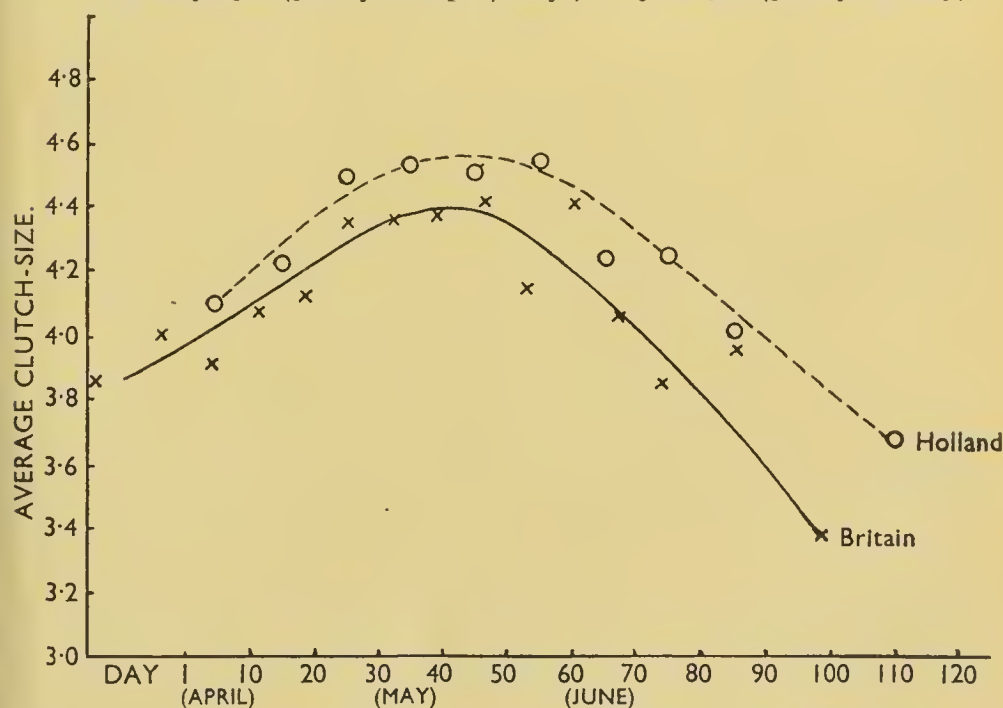
TABLE II.—SEASONAL VARIATIONS IN CLUTCH-SIZE (BRITAIN).

Clutch completed		Clutches of						Total	Average clutch-size
		I	2	3	4	5	6		
March	11-17 ...				2			2	3.9
	18-24 ...			2	12			14	
	25-31 ...			4	37	4		45	
April	1-7 ...		3	8	67	7		85	4.0
	8-14 ...			4	65	10		79	
	15-21 ...			8	87	19	I	115	
	22-28 ...			5	38	32		75	
Ap. 29-May	5 ...			6	31	31		68	4.4
May	6-12 ...		I	3	50	41		95	4.4
	13-19 ...			4	21	25		50	
	20-26 ...		I	6	18	14		39	
May 27-June	2 ...			2	20	19		41	4.4
June	3-9 ...			5	18	7		30	4.0
	10-16 ...			7	19	3		29	
	17-23 ...			2	9	3		14	
	24-30 ...	I			9	I		11	
July	1-7 ...		I	4	6			11	3.4
	8-14 ...		I	3	2			6	
August				I			I	
Total	I	7	73	512	216	I	810	

TABLE III.—SEASONAL VARIATIONS IN CLUTCH-SIZE (HOLLAND).

	1st egg laid	Clutches of						Total	Average clutch-size	
		1	2	3	4	5	6			
Before April 1...					4			4		
Day 0-9 ...			1	7	40	13	1	62	4.1	4.16
10-19 ...			1	9	37	28		75	4.2	
20-29 ...				6	41	53	2	102	4.5	4.51
30-39 ...				2	31	40	1	74	4.5	
40-49 ...			2	4	22	32	3	63	4.5	
50-59 ...			1	2	18	34		55	4.5	
60-69 ...			1	2	14	11		28	4.3	4.18
70-79 ...			1	2	17	12		32	4.3	
80-89 ...			1	4	19	7		31	4.0	
90-99 ...				3	17	2		22	4.0	
100-109 ...	1			1	6	1		9	3.7	
110-119 ...				1	3			4		
Total ...		1	8	43	269	233	7	561		

NOTE:—The days are numbered consecutively from April 1 onwards, e.g. day 43 is May 13th (30 days in April), day 70 is June 9th (31 days in May).



GRAPH I.—AVERAGE CLUTCH-SIZE IN HOLLAND AND BRITAIN.

[It should be noted that the figures on which the graph is based are calculated to two places of decimals, while those in Tables II and III are given to one place only.]

As there is some mortality in the nest, the average brood-size will obviously be rather smaller than the average clutch-size. Nestling mortality, however, is similar for broods of all sizes (see later), so an

analysis of brood-size should give comparable results to an analysis of clutch-size. Extensive data on brood-size are available from the ringing schedules, as bird-ringers generally state the size of the brood when ringing nestlings. There is, however, one source of error, as bird-ringers do not usually say whether a single ringed fledgling came from a brood of one, or whether it was one of a larger brood caught after leaving the nest. It was therefore decided to omit all cases of single young ringed. As broods of one are omitted, the true averages for brood-size are somewhat smaller than those shown in Table IV, and the figures are therefore placed in brackets. Occasionally, one or more members of a larger brood may escape ringing, but it is unlikely that there is a sufficient number of such cases to make an appreciable difference.

In Table IV, every brood ringed between the years 1928 and 1939 has been analysed for brood-size and month. In this case the month refers to date of ringing, i.e., about nine days after hatching, and hence about 3-4 weeks after the date of clutch completion. The monthly variations in brood-size in Table IV confirm those already shown for clutch-size in Tables II and III.

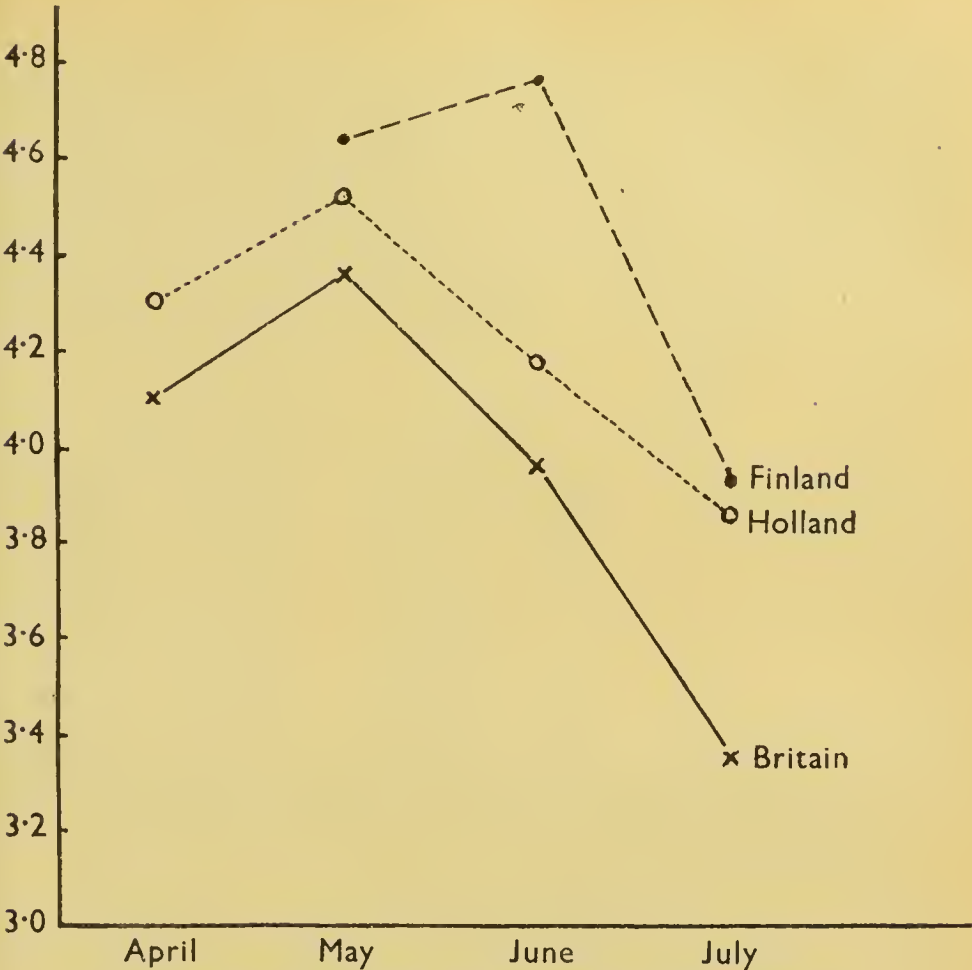
TABLE IV.—SEASONAL VARIATIONS IN BROOD-SIZE (N.W. ENGLAND).

<i>Broods ringed</i>			<i>Broods of</i>						<i>Average brood-size</i>
			2	3	4	5	6	Total	
April	...	...	27	67	122	8		224	(3.50)
May	...	...	100	278	487	214	2	1081	(3.76)
June	...	...	78	194	382	160	2	816	(3.77)
July	...	...	17	53	83	12		165	(3.54)
Total	...	...	222	592	1,074	394	4	2,286	

NOTE:—The averages are not true ones, as broods of one are not specified as such by the ringers, so have to be excluded (see text).

REGIONAL VARIATION.

It is well known that there is a general tendency for clutch-size to increase with latitude from the tropics outwards (Lack, 1947). A comparison of the average clutch-size of the Song-Thrush in Finland and Britain shows that on the average it is 0.5 egg larger in Finland than it is in Britain at the same season. The difference in June is accentuated by the fact that the average clutch-size in Finland is then at its maximum of 4.76 eggs, while in Britain it has begun to decrease and is only 3.96 eggs. It will be noticed that clutches of six and even seven eggs occasionally occur in Finland, while in Britain there are very few records of clutches of six and none of seven eggs. Lack (1947) demonstrated a second general trend, that average clutch-size tends to be smaller in Britain than on the Continent at the same latitude. In the Song-Thrush, clutches in Holland are on the average nearly 0.3 egg larger than in Britain at the same season, as shown in Table V. The differences are statistically significant.



GRAPH 2.—MONTHLY VARIATIONS IN CLUTCH-SIZE.

TABLE V.—REGIONAL VARIATION IN CLUTCH-SIZE.
Finland (Siivonen 1939)

	% Clutches	% Clutches of							Mean
		1	2	3	4	5	6	7	
April ...	—	—	—	—	—	—	—	—	
May ...	40	—	—	7	29	58	5	1	4.64
June ...	53	—	—	4	24	65	6	1	4.76
July ...	7	—	—	26	56	18	—	—	3.93
<i>Finland</i>		<i>Holland</i>				<i>Britain</i>			
	Mean	Mean	Standard error		Mean		Standard error		
			of mean				of mean		
April	—	4.31	±0.045		4.11		±0.029		
May	4.64	4.52	±0.049		4.36		±0.038		
June	4.76	4.18	±0.076		3.96		±0.073		
July	3.93	3.86	±0.117		3.35		±0.170		

NOTE :—Siivonen (1939) gives the total number of clutches as 437. The other columns he gives only as percentages. I could not make these percentages quite correspond with exact numbers of clutches and averages, so have given his figures as they stand.

There are insufficient data to test for regional variation in clutch-size inside Britain. The available data are given in Table VI. Owing to the activity of one ringer, the late Dr. H. J. Moon, who ringed a large number of broods in the Lake District, it is also possible to compare the average brood-size in north-west England with the average brood-size in the rest of England. The latter data are derived mainly from birds ringed in the south of England. In Table VI the average clutch-size appears to be somewhat larger in the south than in the north, while for the average brood-size the reverse applies. In view of this discrepancy, no conclusion can safely be drawn from Table VI.

TABLE VI.—REGIONAL VARIATIONS WITHIN BRITAIN.

<i>Clutches completed</i>			<i>North</i>		<i>South</i>	
			<i>Number</i>	<i>Average</i>	<i>Number</i>	<i>Average</i>
March-April 21	...		228	4.01	62	4.05
April 22-June 2	...		200	4.26	113	4.47
<i>Broods ringed</i>			<i>N.W. England</i>		<i>Rest of Britain</i>	
April ...	...	...	224	(3.50)	1491	(3.42)
May ...	...	...	1081	(3.76)	2339	(3.60)
June ...	...	...	816	(3.77)	1108	(3.54)
July ...	...	...	165	(3.54)	227	(3.19)

NOTE (i) The averages are not true ones, as broods of one are not specified as such by the ringers, so have to be excluded (see text).

(ii) Rest of Britain includes England, Wales and Lowland Scotland, but mainly from the South.

ANNUAL DIFFERENCE.

There are not enough data from the Nest Record Cards to reveal whether or not there exist differences in clutch-size. Any possible differences there might be are obscured by the seasonal differences in the annual sample, and by the variable activity of observers in different years. Annual differences in brood-size, however, can be demonstrated from the ringing records. Owing to the existence of seasonal variations in brood-size, each month must be considered separately. The data for the month of June are set out in Table VII for all England, Wales and Lowland Scotland grouped together, and also separately for H. J. Moon's sample for north-west England. The average brood-size varies quite markedly in different years, (from 3.42 in 1935 to 3.92 in 1934 in Moon's data), and analysis shows that the average differences are statistically significant. Similar average differences were found for May broods, but these were not statistically significant.

An attempt was made to correlate these variations in brood-size with weather conditions, but the present data are not sufficiently detailed for this purpose, and no correlations were apparent. However, it is of considerable interest that similar annual variations in average brood-size occur in the Blackbird, and that these are significantly correlated with those of the Song-Thrush, i.e., in a

year when the June broods of the Song-Thrush were larger than usual, there was a significant tendency for those of the Blackbird to be larger than usual (Lack, in press). This strongly suggests that some climatic factor is concerned. It may be added that there was no tendency for the averages in May and June in any one year to be correlated.

TABLE VII.—ANNUAL DIFFERENCES IN BROOD-SIZE FOR JUNE.

Year.	All England.		N.W. England	
	Number of broods	brood-size (average)	Number of broods	brood-size (average)
1929	...	75	38	3.74
1930	...	127	67	3.75
1931	...	196	80	3.89
1932	...	200	91	3.88
1933	...	173	83	3.82
1934	...	209	74	3.92
1935	...	268	117	3.42
1936	...	192	94	3.80
1937	...	98	6	3.83
1938	...	194	83	3.78
1939	...	179	83	3.86
Total	...	1,911	816	3.77

NOTE :—The standard error per brood for all England is 0.90, and for N.W. England is 0.87. To obtain the standard error of the averages, the figures should be divided by \sqrt{N} when N = number of broods. The averages are not true ones, as broods of one are not specified as such by the ringers, so have to be excluded (see text).

NESTING SUCCESS.

In Table VIII, nesting success or failure is calculated first per nest and secondly per egg. On the average 71% of the eggs hatch, and 78% of the hatched young leave the nest, i.e., 55% of the eggs laid produce young which leave the nest. It will be noticed from Part A that partial failure in the nestling stage is only 7% of the total. This is to be expected, as predation is the most usual cause of nesting failure, and if a predator finds a nest, it usually takes all the young.

TABLE VIII.—SUMMARY OF NESTING SUCCESS.

A.—Per nest.			
	Number of nests	Complete success	Partial failure
Egg to hatching	179	96 (53%)	46 (26%)
Young to flying	272	203 (75%)	19 (7%)
B.—Per individual egg or young.			
	Total at start	Successful	% Successful
Egg to hatching	...	739	71
Young to flying	...	1034	78
Percentage of eggs laid which produce flying young			55

A more elaborate analysis is given in Tables IX and X to test whether nesting success varies with either clutch-size or season. Figures are given with complete losses both included and excluded, so as to separate out the effect of predation. Nesting success does not vary appreciably with clutch or brood-size, as was also found by Lack (1946) for the Robin. Any seasonal differences in nesting success are also small, and further data are needed to prove whether they are significant. It may be added that, as found by Lack for the Robin, there are probably marked local variations in nesting success, hence large series of data are needed before the influence of any other factor can be tested.

TABLE IX.—SURVIVAL OF EGGS.

<i>Month</i>	<i>No. of eggs laid with losses of entire clutches</i>		<i>No. of young hatched</i>	<i>% hatched with losses of entire clutches</i>	
	<i>Included</i>	<i>Excluded</i>		<i>Included</i>	<i>Excluded</i>

A.—In relation to clutch-size.

Clutch-size

1	1	—	—	—	—
2	6	6	5	—	—
3	42	36	31	74	86
4	460	348	307	67	88
5	230	200	182	79	91

B.—In relation to season.

March ...	71	60	53	75	88
April ...	301	228	208	69	91
May ...	299	261	225	75	86
June ...	64	37	35	55	95
July ...	4	4	4	—	—
Total	739	590	525	71	89

TABLE X.—SURVIVAL OF YOUNG

<i>No. of young hatched with losses of entire broods</i>	<i>No. of young leaving</i>		<i>% young leaving, losses of entire broods</i>	
<i>Included</i>	<i>Excluded</i>	<i>leaving nest.</i>	<i>Included</i>	<i>Excluded</i>

A.—In relation to brood-size.

Brood Size

1	8	6	6	—	—
2	50	48	48	96	100
3	129	105	105	81	100
4	532	420	401	75	95
5	315	260	248	79	95

TABLE X.—SURVIVAL OF YOUNG
(continued)

Month	No. of young hatched with losses of entire broods		No. of young leaving nest.	% young leaving, losses of entire broods	
	Included	Excluded		Included	Excluded
	B.—In relation to season.				
March ...	97	62	61	63	98
April ...	403	316	301	75	95
May ...	444	389	375	84	96
June ...	80	62	62	77	100
July ...	10	10	9	—	—
Total ...	1,034	839	808	78	96

LAYING SEQUENCE.

The data in Table XI show that the Song-Thrush generally lays one egg each day until the clutch is complete. A few records suggest, however, that the interval between each egg may not always be 24 hours. It should be noted that, if the true interval between the laying of two eggs was 23 hours, then an observer who visited a nest at the same time each day might record the two eggs as laid in one day (if one egg happened to be laid just after his first visit and the next just before his second visit). Similarly, a 25-hour interval could be recorded as a whole day missed. Hence a record is needed of the time of day of each visit as well as the date, in order to see clearly what is happening. The apparent cases of departure from the rule of one egg laid each day were not always recorded at the same stage in the clutch.

One Carolina Wren (*Thryothorus ludovicianus*) (Nice and Thomas, 1948) and two Willow-Warblers (*Phylloscopus trochilus*) (Kuuisisto, 1941) have been shown to lay their eggs at almost exactly 24-hour intervals. It is not known whether this applies to the Song-Thrush.

This section could have been much amplified if observers had always recorded the time of day at which they visited the nest, and preferably if they had visited each nest more than once each day during the laying period.

TABLE XI.—APPARENT LAYING SEQUENCE.

				No. of cases in	
				March and	May and
				April	June
				Total	
2 eggs recorded on one day	...	...	2	2	4
1 egg recorded per day	...	...	52	37	89
Gap of one day	...	...	15	4	19
2 gaps of one day each	...	...	1	1	2

INCUBATION PERIOD.

The incubation period is difficult to record precisely owing to the uncertainty of its start. Eggs in the same clutch would not normally have markedly different incubation periods, and the fact that they do not always hatch on the same day means that their incubation began at different times, i.e., that incubation started before the clutch was complete. This can easily escape observation if the bird sits intermittently on the first day or two. To reduce the error due to this cause, it is best to assess the incubation period from the date on which the last egg of the clutch was laid to the date on which the last young hatched, as suggested by Moreau (1946), and this procedure has been followed here. It is known, however, that there is sometimes a pause of a day or two after the clutch is completed before regular incubation begins. In these cases, if the incubation period is recorded as suggested above, then the recorded period is longer than the actual incubation period. Owing to lack of more exact details this possibility had to be ignored in the present analysis.

Moreau (1946) has also drawn attention to the fact that if the observer visits his nests once each day, there is a possible maximum error of one day (actually just less than one day) in the observed time of laying or hatching, i.e., the egg might have been laid, or the young hatched, just after the observer had left on one day, or just before he arrived on the next. Hence, both for laying and hatching, the observed time may be up to one day *later* than the actual time, but it cannot, of course, be *earlier*. Hence there is a maximum possible error of \pm one day in the observed incubation period. (The incubation period will be recorded as nearly one day too short if the bird laid its last egg just after the observer had paid his daily visit, and as one day too long if the young hatched just after the daily visit). For this reason, if an accurate hatching or nestling period is required, it is better for the observer to visit each nest more than once each day during the critical periods.

The figures in Table XII suggest that, for clutches completed in March and April, the incubation period is half a day longer than for clutches completed in May and June. This possible variation may be due to a delayed start of incubation in the nests early in the season. The difference is not statistically significant. Lack (1948) found a similar decrease in the incubation period of the Robin; hence further data will probably prove this difference to be genuine. The incubation periods were also analysed by clutch-size. The average for a c/4 was 13.4 and for a c/5 13.0 days, but as clutches of five eggs are rare early in the season, this difference is presumably due to the seasonal difference already mentioned, not to a variation in the incubation period with clutch-size *per se*.

TABLE XII.—APPARENT INCUBATION PERIOD.

<i>Period in days</i>		<i>Number of cases for clutches laid in</i>			<i>Total</i>
		<i>March and April</i>	<i>May and June</i>		
10	—	1	1
11	1	1	2
12	6	7	13
13	16	15	31
14	14	9	23
15	3	2	5
16	—	1	1
17	3	—	3
Average in days		...	13.6	13.1	13.4

HATCHING SEQUENCE.

All the eggs of a clutch are unlikely to hatch simultaneously. Hence a daily visit at a fixed time may give a misleading appearance of hatching being spread over two days when it is really spread over one. However, where a clutch was recorded as hatching over three consecutive days, the first egg presumably hatched more than 24 hours before the last. An extended hatching period is normally due to incubation having started before the last egg was laid. The data in Table XIII suggest that for the Song-Thrush a spread of two or more days in hatching occurs more often in a large than in a small clutch (55% of all recorded clutches of five). It also occurs more often in June than early in the season, but there are a greater number of clutches of five in June than earlier. There are not enough data to be certain whether clutch-size or time of year is the important factor ; both might be involved.

TABLE XIII.—APPARENT HATCHING PERIOD.

<i>Hatched during</i>			<i>Number of cases for clutches of</i>			<i>For broods hatched in</i>			
			<i>2 & 3</i>	<i>4</i>	<i>5</i>	<i>April</i>	<i>May</i>	<i>Jun.-Jul.</i>	<i>Total</i>
1 day	...	...	13	78	25	44	50	22	116
2 days	...	...	3	22	21	10	23	13	46
3 days	...	...	—	1	9	2	6	2	10
Total	16	101	55	56	79	37	172

% which apparently hatched over 2 or 3 days	(19)	23	55	21	37	41	33
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NESTLING PERIOD.

In the Song-Thrush, all the chicks of a brood usually leave the nest on the same day, even when they are not all of the same age. Hence a nestling period recorded from the day on which the last chick hatched to the day on which the last chick left the nest will sometimes be shorter than a nestling period recorded from the first chick hatched to the first chick leaving the nest. The data on nestling periods of the Song-Thrush were analysed in both ways, the average obtained from the last chick hatched to the last leaving the nest being 12.9 days, and the average obtained from first hatched to first leaving the nest being 13.2 days. The figures in Table XIV are calculated from the first chick hatched to the first chick leaving the nest. As in the case of incubation periods, there is a maximum error of \pm one day in the observed nestling period when the nest is visited once daily. Another error is introduced if the observer disturbs the young, as this may result in the young leaving the nest prematurely.

It will be seen that for the Song-Thrush, the nestling period appears to be slightly longer early than late in the season. There are too few data for the difference to be statistically significant, but, as in the case of incubation periods, more data would probably confirm this decrease, as it was also found to occur in the Robin (Lack, 1948). The nestling period is also apparently nearly half a day shorter for large than for small broods, but again it is probably not correlated with brood-size *per se*, but merely reflects the seasonal variations in brood-size, as most b/5s occur late in the season.

TABLE XIV.—APPARENT NESTLING PERIOD.

<i>Nestling period in days.</i>	<i>Number of cases.</i>			<i>For broods hatched in</i>			<i>Total</i>
	<i>For brood-sizes of</i>	<i>1, 2, 3</i>	<i>4</i>	<i>5</i>	<i>April</i>	<i>May</i>	<i>Jun.-Jul.</i>
9	—	—	1	—	—	1	1
10	—	—	—	—	—	—	—
11	1	7	3	2	5	4	11
12	9	16	13	11	19	8	38
13	17	27	8	9	29	14	52
14	20	22	11	22	24	7	53
15	1	6	2	1	6	2	9
16	2	4	2	2	4	2	8
17	—	1	—	—	1	—	1
Average in days	13.3	13.2	12.9	13.3	13.3	12.9	13.2

SUMMARY.

1. Attention is drawn to the value of the British Trust for Ornithology Nest Record Cards.

2. The usual laying period for the Song-Thrush in Britain is from mid-March to mid-July and it usually lays a clutch of four or five eggs.

3. The average clutch-size in Britain increases from early spring to a peak in May, and then decreases again. A similar seasonal variation occurs in Holland and Finland, but in the latter the peak occurs in June.

4. The average clutch-size is larger in Holland than in Britain, and larger still in Finland, at the same time of year. Regional differences within Britain require further study.

5. There is a significant variation in average brood-size in different years in Britain.

6. Predation is the most usual cause of nesting failure. Nesting success does not vary appreciably with clutch-size or season.

7. The Song-Thrush usually lays one egg each day until the clutch is complete. A few exceptions have been recorded, but more data are needed.

8. The average incubation period is 13.4 days and the nestling period is 13.2 days. Both periods appear to be slightly longer early than late in the season.

ACKNOWLEDGMENTS.

In addition to Dr. Julian Huxley, Mr. James Fisher, Mr. A. Whitaker, Dr. H. N. Kluijver and Miss Leach, who are mentioned in the introduction, I must tender thanks to those members of the British Trust for Ornithology who have completed Nest Record Cards for the Song-Thrush, thereby providing much of the data for this paper. I am also extremely grateful to Dr. David Lack for much helpful advice and criticism.

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STUDIES OF SOME SPECIES RARELY PHOTOGRAPHED.

XIX. THE GREEN SANDPIPER.

Photographed by OLOF SWANBERG.
(Plates 19-21).

THE Green Sandpiper (*Tringa ochropus*) is, after the common species such as Common Sandpiper and Dunlin, probably the most familiar of the passage waders occurring in inland localities in Britain, where its strikingly black and white appearance on the wing make it easy to recognize.

It has a wide breeding distribution in northern, north-central, and eastern Europe and ranges right across Asia. As is well known, it usually breeds in old nests of other birds and Mr. Swanberg's photographs taken in spruce forest in Middle Sweden show a bird and eggs in an old nest of the Song-Thrush (*Turdus ericetorum*). The photographs were taken on June 30th, 1946, but Mr. Swanberg informs us that this is an abnormal date, the species usually having fresh eggs in Sweden in late April or early May and up till mid-May. It will be noticed that the eggs, one of which is a dwarf specimen, are lying on a considerable bed of lichens, moss and some bents, torn away by the bird from the outside of the nest. The nest was examined on June 9th before the eggs were laid and then contained only a few lichens. Mr. Swanberg informs us that in the case of two other clutches examined in Song-Thrush's nests in 1945, the bird had made a similiar bed for the eggs, though not so heavy as in the present case.

B.W.T.

A PHOTOGRAPH OF THE LITTLE GULL IN FLIGHT

(Plate 22).

IN Vol. xxxix, plates 1-6, we published an excellent series of photographs of breeding Little Gulls (*Larus minutus*) taken by Mr. Fr. Haverschmidt in Holland. We think readers having this series will like to have it supplemented by an equally excellent photograph of the bird in flight taken by Mr. Arthur Christiansen in Denmark and showing particularly well the characteristic dark under-wing, which, more especially in winter when the black hood is lacking, is an important field-character.

B.W.T.



GREEN SANDPIPER (*Tringa ochropus*) ABOUT TO SETTLE ON EGGS IN OLD NEST
OF SONG-THRUSH, SWEDEN, JUNE 30TH, 1946.

(Photographed by Olof Swanberg).



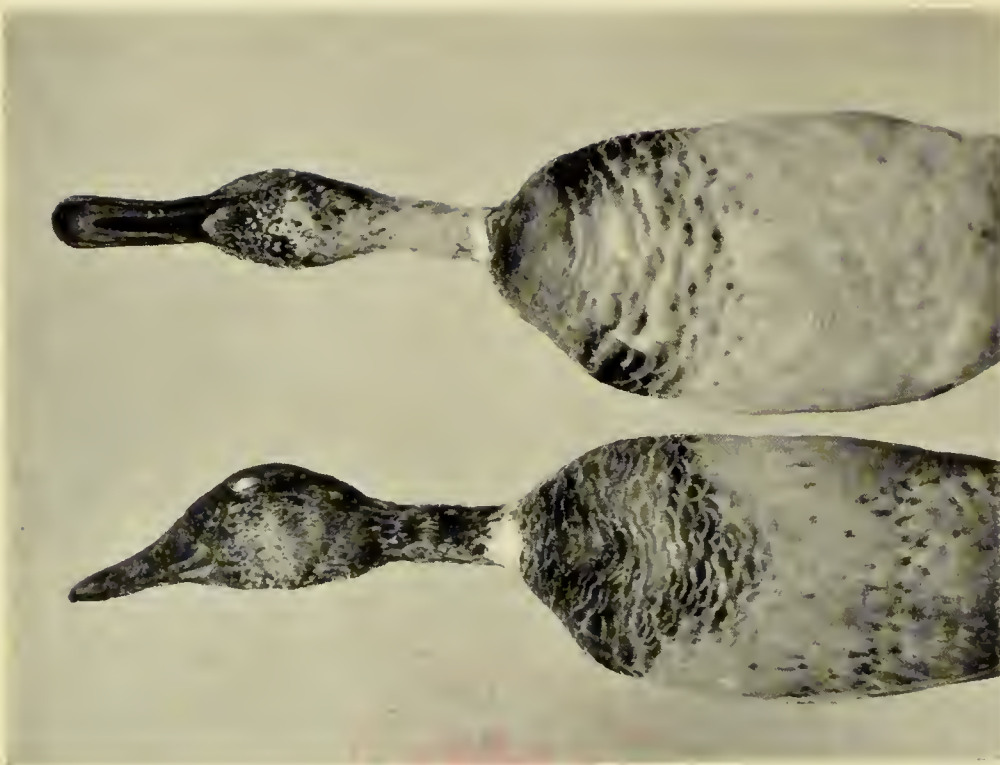
GREEN SANDPIPER (*Tringa ochropus*) BROODING EGGS IN SAME NEST AS SHOWN IN PLATE 19.
(Photographed by Olof Swanberg).



GREEN SANDPIPER (*Tringa ochropus*).
EGGS IN SAME NEST AS SHOWN IN PLATES 19 AND 20.
(Photographed by Olof Swanberg).



LITTLE GULL (*Larus minutus*): ADULT IN FLIGHT,
SHOWING DARK UNDER-WING.



DRAKE MALLARDS COMPLETING AUTUMN MOULT.

LEFT: NORMAL (Coll. J. M. Harrison).
RIGHT: SHOWING SPOTTED BREAST SHIELD (Coll. J. G.

EXCEPTIONAL INLAND PASSAGE OF BLACK TERNS IN 1948.

BY
R. A. HINDE.

DURING the spring of 1948 Black Terns (*Chlidonias niger*) were recorded in England in unusual numbers. The following report is based on records of over 150 flocks containing over 2,000 birds. Most of these were obtained as a result of an appeal for information in a previous number (*antea*, Vol. xli, p. 315), but also included are records of Black Terns obtained in the British Trust for Ornithology enquiry into the inland migration of waders and terns, organized by R. A. Hinde and J. G. Harrison, the full results of which are to be published shortly. All except five of the records refer to inland localities, but it is probable that many birds travelling by coastal routes went unrecorded.

Table I shows the total number of flocks of Black Terns, and the number of individuals which they contained, recorded during the period of the main passage. The records have been divided into two sections, those from Somerset, Gloucestershire, Oxfordshire, Northamptonshire and counties north and west of these (Area A), and those from counties south and east of these (Area B). Groups of birds which split up into several parties on leaving have not been counted as separate flocks.

Date: May		13	14	15	16	17	18	19	20	21	22	23	24
Area A	No. of flocks	—	—	1	9	17	31	15	5	4	1	1	—
	No. of birds	—	—	3	91	227	664	180	19	45	35	2	—
Area B	No. of flocks	1	—	1	6	7	10	11	15	15	7	1	—
	No. of birds	1	—	2	40	56	143	102	224	400	39	1	—

TABLE I.—NUMBER OF FLOCKS AND NUMBER OF BIRDS SEEN DURING THE PERIOD OF THE MAIN PASSAGE.

The first birds recorded were four seen at Cambridge Sewage Farm on April 20th. Only 27 records, referring to 50 birds seen in flocks of up to five individuals, were made between this date and May 15th. These records are scattered almost at random throughout the period April 20th to May 15th, though nine records referring to 22 birds, were made on May 8th or 9th. The main passage began on May 16th and lasted until May 22nd. The peak of this rush was reached three days later in the south-eastern counties (Area B) than it was in the west midlands (Area A). In Area A the number of birds seen on each day rose rapidly to a maximum of 664 birds in 31 flocks on May 18th. The main passage in this area was over by May 20th, although a few flocks were recorded

on May 21st to 23rd. In Area B the numbers seen each day increased more slowly, and the maximum of 400 birds in 15 flocks was not reached until May 21st; seven small flocks were seen on May 22nd, and single birds on the 23rd and 25th. A late bird was seen near Troon on June 5th.

The maxima in the north-western (Area A) and south-eastern (Area B) districts on May 18th and 21st are distinct, and since both fall on weekdays, neither can be said to be due to more intensive watching at weekends. The figures would thus seem to indicate that two waves of migrants passed through between May 16th and 22nd, one in which most individuals passed through Area A, and another in which most passed through Area B about three days later.

In twelve cases observers recorded the directions in which flocks left after a halt for rest or food. These are shown in Table II.

<i>County</i>		<i>Date</i>	<i>Direction</i>
Sussex	... ..	May 17th	E.S.E.
Hertfordshire	... ..	21st	N.E.
Norfolk	... ..	4th	N.
		19th	N.
		20th	N.
Cambridgeshire	... ..	22nd	E.N.E.
Worcestershire	... ..	18th	N.E.
		18th	N.
		21st	N.E.
Warwickshire	... ..	18th	N.E.
Nottinghamshire	... ..	18th	N.E.
Yorkshire	... ..	19th	E.
Cheshire	... ..	17th	E.

TABLE II.—DIRECTIONS IN WHICH FLOCKS WERE RECORDED LEAVING AFTER HALTS.

The suggestion in *The Handbook of British Birds* (1943) that there are two inland routes, one through Somerset and the west midlands to Cheshire and south Lancashire and thence across south Yorkshire to the Humber, and another from the Thames through the home and eastern counties, is thus supported by the 1948 evidence, though it seems probable that the majority of the birds seen in the eastern counties were taking a direct short cut from the south coast north-eastwards to the Wash. Of course the routes are not to be pictured as narrow lanes, but rather as areas through which the majority of the birds pass. The birds seen at Pagham, Sussex, on May 17th flying E.S.E. were presumably following the coast.

The weather situation over southern England and the Bay of Biscay area during the main period of passage can briefly be summarized as follows: Temperature:—After being fairly high in France and southern Spain on May 7th-9th, temperatures fell off again, but rose unusually high at Corunna on the 14th (1800 hrs. Temp 66°F.) and in France on 15th-18th (1800 hrs. temperatures

on May 15th, 16th, 17th and 18th at Brest were 70°, 64°, 70°, 75°F., and at Bordeaux were 70°, 79°, 79°, 82°F.). After this, temperatures in the Bay of Biscay area returned to normal.

Winds:—Winds were northerly over the Bay of Biscay and Spain from May 11th to 14th, with some moderate south-westerly winds south-west of Ireland on the 12th and 13th. From May 15th to 17th almost calm conditions prevailed over the Bay of Biscay, France and Spain, with moderate easterly or north-easterly winds over the British Isles. On the evening of the 17th winds were moderate to strong easterly to north-easterly over the British Isles and north France, with light variable winds over south France and Spain. This situation was maintained until the 22nd, the winds becoming gradually reduced in strength and backing slightly on the 21st. Thus the main portion of the Black Tern migration through the British Isles took place a day or two after exceptionally warm weather in France and Spain, and in the face of moderate easterly or north-easterly winds.

These conditions may be compared with those during the exceptional passage of Black Terns in 1946 (*British Birds*, Vol. xl, pp. 24, 93 and 378). In that year the pattern of the migration was quite different from that in 1948: comparatively few birds were seen in the western counties, the absence of south coast records seemed to indicate an influx from the east, and the peak of the migration occurred on May 8th to 13th, with the maximum number of birds seen on the 11th. Winds over the British Isles were moderate to strong north-easterly from the 6th to the 14th, when they backed to the north. These north-easterly winds blew across north France from the 9th to the 13th, but were slightly less strong than over the British Isles. Winds over south France and Spain were light to moderate northerly on the 6th, calm to moderate and variable on the 7th, calm to light variable on the 8th to 11th, with southerly winds off Portugal on the 8th-10th. Temperatures were fairly steady over France and Spain during the period of passage: it is not possible to trace any peak in Spain before the arrival of the birds, though there had been some increase during the first week of May and temperatures were slightly above average. Both the distribution of the records in 1946, and the weather conditions at the time of passage, thus support the suggestion that the exceptional passage in this year was due to the unusually strong north-easterly winds carrying birds migrating northwards to the west of their track.

It is not possible to trace any northward movement from the dates and the localities of the 1948 records. This is probably due to the speed with which the birds crossed the country, but some birds may have travelled some way up the west coast and only struck inland when some way north.

Many observers remarked on how the numbers fluctuated in the course of a single day. On the other hand there were several records

of what was probably the same flock remaining at the same place for two or more days, even at the height of the rush.

Two particularly large flocks are worthy of special note. On the evening of May 21st between 120 and 130 birds were seen over Wilstone Reservoirs, Tring. The birds moved backwards and forwards over the reservoir and "a reedy cry" was heard. "At 8.25 p.m., with an intensification of the calls, a party of 37 climbed obliquely up to about 100 feet and circled back over the reservoir to gain more height before heading off north-east a similar party left ten minutes later." (R. S. R. Fitter and P. A. D. Hollom). On May 18th about 100 birds were seen over Witcombe Park, Gloucester. "When it was dark first one lot rose up and circled out of sight and then the rest followed them" (Mrs. D. Hicks Beach *per* A. Whitaker). It is interesting to note that in both these cases the flock broke up before continuing its journey. Similar evidence of the impermanence of the flocks has been given by other observers.

The records are tabulated by counties below. We are indebted to all those who sent in records.

SOMERSET.—Cheddar Res., 16 on May 17th, 41 on 18th; Blagdon Res., ten on May 18th; Durleigh Res., nine on May 21st. (B. King, M. J. Wotton, E. G. Richards).

DORSET.—Abbotsbury, one on May 18th; Witehampton, one on May 20th. (H. R. A. Cornish, H. Hanham, K. B. Rooke).

HANTS.—Winnal, Winchester, eight on May 20th, 18 on 21st, one on 22nd; Christchurch, one on May 16th. (J. Wilson, A. C. Hughes, A. J. Bull, M. B. Casement).

SUSSEX.—Rye Harbour, one on May 12th; Rye Gravel Pits, one on May 17th; Pagham, seven on May 17th. (G. des Forges, B. Metcalfe, J. M. Cullen, D. D. Harber).

KENT.—Dungeness, 11 on May 21st. (M. Romer).

SURREY.—Frensham Ponds, two on May 16th, one on 17th, ten on 18th, ten on 19th, 35-40 on 20th, over 50 on 21st; Barn Elms Res., one, April 29th, two on May 15th, five on 16th, 12 on 17th, ten on 20th, 30 on 21st, one on 22nd, one on 23rd; Guildford, three on May 18th, ten on 19th, eight on 20th, eight on 21st. (G. C. Low, G. A. Hebditch, S. Cramp, D. Charlwood, Miss P. Bond, C. R. Bird, R. Zambóni).

ESSEX.—Abberton Res., 64 on May 20th (G. A. Pyman).

HERTS.—Watford, one on May 4th, one on 9th; Wilstone, three on May 8th, two on 22nd; Aldenham Res., seven from May 19th to 21st; Springwell Lake, five on May 19th, 39 on 21st; Stocker's Lake, 12 on May 21st; Tring, one on April 22nd, two on May 8th, 14 on May 16th, 46 on 18th, six on 19th, 26 on 20th, separate flocks of about 125, 11 and 35 on May 21st, one on 22nd. (W. E. Glegg, R. S. R. Fitter, P. A. D. Hollom, M. G. Ridpath, J. N. Hobbs, Mrs. B. Lloyd, A. C. Frost).

MIDDLESEX.—Staines Res., four on May 9th, 25 on May 22nd, one on 25th; Staines Moor, one on May 20th; Poyle Gravel Pits, five on May 18th; Feltham Gravel Pits, one on May 18th; Hampstead, seven on May 20th. (J. A. Bailey, K. V. Elphinstone, E. G. Pedler, P. J. Hayman, Mrs. H. M. Rait-Kerr, C. A. White).

BERKSHIRE.—Burghfield, two on May 17th, about 30 on 20th; Theale, nine on May 19th, seven on 20th. (C. E. Douglas).

OXFORD.—Blenheim, three on May 19th. (E. H. Lousley).

BUCKINGHAMSHIRE.—Weston Turville, 11 on May 19th, three on 20th, 35 on 21st. (A. R. Nickels, R. S. R. Fitter, S. Kelaway).

NORFOLK.—Rockland, two on May 4th, seven on 20th ; Fowlmere, five on May 8th ; Tottington, two on May 16th ; Ringmere, one on May 18th ; Cley, six from May 17th to 19th ; Alderfen, two on May 19th, two on 22nd ; Costessey, three on May 21st. (R. G. Pettitt, M. Meiklejohn, I. and D. V. Butt, A. E. Vine).

SUFFOLK.—Bury St. Edmunds, one on May 19th, one on May 21st. (D. V. Butt).

CAMBRIDGE.—Cambridge Sewage Farm, four on April 20th, one on May 10th, one on 13th, 16 on 16th, 27 on 17th, over 65 on 18th, 35 on 19th, seven on 20th, 15 on 21st ; Manea Ponds, five on May 18th ; Shippea Hill, seven on May 22nd. (Cambridge Bird Club *per* A. D. G. Smart and R. A. Hinde, A. E. Vine).

NORTHAMPTONSHIRE.—Oundle, one on April 28th (B. W. H. Coulson).

GLOUCESTERSHIRE.—Witcombe, about 12 on May 17th, about 100 on 18th ; Dowdeswell, 27 on May 19th (D. H. Beach, A. Whitaker).

WORCESTERSHIRE.—Upper Bittell, three on May 8th, 23 at 8 a.m. and 33 at 4 p.m. on May 18th, ten on 19th, two on 20th ; Werford Pool, Witley Court, two on May 16th ; Upton Warren Pool, six on May 17th ; Westwood Park, 27 on May 17th. (G. C. Lambourne, C. A. Norris, A. R. Blake, G. C. Johnson, L. Salmon, Mrs. E. Butler, G. W. Rayner, K. E. Clifford, C. R. L. Reece).

WARWICKSHIRE.—Alvecote Pools, eight on May 16th, six on 18th ; Shustoke Res., 27 on May 18th ; Bodymore Heath, five on May 18th ; Seeswood Pool, 13 on May 18th ; Bartley Res., two on May 18th ; Earlswood Lakes, one on May 19th, six on 21st ; Wootton Waven, four on May 18th. (G. C. Lambourne, M. A. Arnold, G. W. Rayner, G. C. Johnson, J. R. Rawsthorne, C. A. Norris, J. Sears).

STAFFORDSHIRE.—Chillington Park Lake, one on May 17th ; Bellfields, two on May 9th, three on 15th, six on 16th, 45 on 17th, 58 on 18th, 35 on 19th ; Gailey, five on April 21st, ten on May 17th, three on 18th ; Cannock Res., 45 on May 18th, two on 20th, 28 on 21st ; Cannock, 25 on May 18th. (G. C. Lambourne, C. L. Taylor, M. P. Bishop, M. J. Rogers, J. R. Rawsthorne, A. W. Wolton, G. W. Rayner, L. Salmon, W. S. Peach, C. A. Norris, R. L. Vernon).

SALOP.—Baschurch, three and seven on May 16th ; Marton, 15 on May 17th to 19th ; Berrington, two on May 19th. (D. T. Wilks, R. Harrison, W. C. Pugh).

LEICESTERSHIRE AND RUTLAND.—Stanford Res., 18 on May 16th, 46 on May 18th ; Swithland Res., three on May 17th, six on 19th ; Groby Pool, six on May 17th ; Cropston Res., 16 on May 18th ; Eye Brook, 35 on May 16th, 35 on 17th, 80 on 18th, 11 on 19th ; Loughborough, two on May 23rd. (R. F. Chatfield, Leics., and Rutland Orn. Soc. *per* F. A. Bak).

NOTTINGHAMSHIRE.—Rylands, 11 on May 16th ; Hilton Gravel Pits, six on May 17th to 20th ; Netherfield, 36 on May 17th and 18th ; Nottingham Sewage Farm, 30-40 on May 22nd. (S. Allison, J. Staton, J. C. Voysey).

MERIONETHSHIRE.—Llanbedr, five on May 18th. (P. Alan Burt).

CHESHIRE.—Marbury, one on May 4th, three on May 17th, four on May 18th ; Billinge Green, three on May 17th ; Delamere, two on May 17th ; Tabley, three on May 17th, six on 18th, ; Rostherne, three on May 17th, two on 18th ; Mersey, two on May 17th. (A. W. Boyd, W. Ashley, M. Dean, R. Whittenbury, J. Cassera, C. A. Milner, K. D. G. Mitchell).

LANCASHIRE.—Pennington, one on April 22nd, three on May 1st, two on 5th, 11 on 18th, 13 on 19th, eight on 20th, two on 21st ; Astley, one on May 16th, two on 18th, 18 on 19th, one on 20th. (T. Edmondson, F. R. Horrocks, J. Hadfield, C. A. Milner).

YORKSHIRE.—Eccup, one on May 17th, five on 18th, four on 19th ; Malham Tarn, eight on May 18th, 18 on 19th ; Ilkley, nine on May 18th ; Winterset Res., 11 on May 19th ; Swillington, four on May 18th. (K. Brown, J. Cudworth, P. Holmes, A. Gilpin).

CUMBERLAND.—Siddick Ponds, Workington, one from May 8th to 12th. (R. Walker).

AYRSHIRE.—Troon, one on June 5th. (G. Hughes-Onslow).

NOTES.

YOUNG BIRDS RETURNING TO THE NEST.

WITH reference to several previous notes under this heading (*antea*, Vol. xxxix, pp. 26, 152, 246, 313, 374) I here record four occurrences of such behaviour that I witnessed during 1948.

On June 7th I found the nest of a Willow-Warbler (*Phylloscopus trochilus*) containing six well-grown young. As I approached, the six young left the nest, but as I passed that way again the following day I observed that the nest was full of young once more.

On July 6th I found another Willow-Warbler's nest containing five young about 8-10 days old. As I was ringing them one of them flew off into some bracken and I failed to find it afterwards. But when I inspected the nest the following day I found all five young inside.

Also on June 7th I found the nest of a Whitethroat (*Sylvia communis*) in Cheshire containing five young about ten days old. Whilst I was ringing them, two of them suddenly jumped out of the nest and fluttered away and I failed to locate them. However, when I returned about ten hours later I found all five young in the nest.

In early June I examined the nest of a Wren (*Troglodytes troglodytes*) about six feet above the ground and in so doing I disturbed the four young inside which flew out and down on to the ground. Two days later I happened to inspect the nest again and found all four young back inside.

JOHN SOUTHERN.

NUPTIAL BEHAVIOUR OF MAGPIE.

THE following behaviour of the female Magpie (*Pica pica*) was observed near Bicester, Oxon, on May 28th, 1948. The female was feeding in a field behind a high hedge, over which the male flew; on seeing the female he planed down towards her and passed a few inches above her head. The female then flattened her body to the ground, raising the head, with beak pointing upwards, and tail to an angle of *c.* 75° to the ground, over which both wings were spread. The male, being some distance away, then turned and again passed low over the female's head with the same response by the female. The male returned and alighting by the female stood watching her for a while; then she gradually stood up with beak and tail still pointing sharply upwards. As the male fed close by, the female gradually lowered and raised the body several times. Finally, with fanned tail and the white feathers at the sides of the body fluffed out, the male walked round the female, which lowered both head and tail, and coition took place.

BERTRAM M. A. CHAPPELL.

COURTSHIP FEEDING OF STARLING.

ON May 4th, 1947, an adult male Starling (*Sturnus vulgaris*) was observed feeding an adult female with some house scraps from my bird table and again with bacon rind on May 6th, 1947.

On both occasions a splendid view was obtained of the birds, which were on the lawn and about five yards from the dining-room window, from where they were watched by my wife and myself.

In each instance the female was in excellent breeding-plumage, which was slightly fluffed out with the body held in a crouching position and the beak opened slightly. The food offered was taken on both occasions and coition took place after the second instance.

BERTRAM M. A. CHAPPELL.

REMARKABLE ACCUMULATION OF NEST MATERIAL . BY STARLING.

DURING the late war an unusual nest was built by a pair of Starlings (*Sturnus vulgaris*) in the roof space of my house in Oxford. I was at the time too busy to take an active interest in ornithology, and so can supply no details beyond the measurements given below.

My curiosity was aroused by the exceptional activity of the birds, and it slowly penetrated to my consciousness that they had been carrying nesting material at high pressure for several days through a vertical ventilation slit (known, I believe, as a loop-hole), about three inches wide and eighteen inches or so in height, in the eastern wall of the house.

I accordingly went into the roof space, the floor of which is unboarded and so consists of rafters with plaster between, and found the birds had commenced to build a nest on the rafter below the slit, and continued to increase it until they had erected a mound of straw and dry grass reaching almost to the slit, the bottom of which was rather more than three feet above the rafters. The cup of the nest was against the wall just under the slit.

The highest point of the mound (three feet) was immediately below the slit, where it was four feet wide. It became wider and a foot from the wall was approximately five feet wide, and at two feet was the same width and still two feet tall. At three feet from the wall it was still eighteen inches tall and over three feet wide, petering out in something like a point five feet six inches from the wall.

Eggs were laid and young reared, but lack of time prevented my keeping a watch on the proceedings. However, I measured the structure again after the young had flown and found the mound had settled until it was two feet three inches tall at the highest point instead of the original three feet.

H. J. HARRISON

TWO-BARRED CROSSBILLS IN SURREY.

DURING the morning of March 11th, 1948, I was watching a number of birds feeding in a row of mixed Austrian and Scots Pines. There were about 70 Chaffinches (*Fringilla cœlebs*), several Greenfinches (*Chloris chloris*), three Hawfinches (*Coccothraustes coccothraustes*) and four birds which I did not recognize. Two of them were of a brick-red colour with brownish wings and tail; the others were of a greenish-yellow, striated with brown. The wings and tail were

brownish. All four of the birds had two very distinct white wing-bars. The tails were short and forked. The size was similar to a Bullfinch. They were feeding on cones—generally holding them on the branch, though once or twice they hung on in a very tit-like fashion. After a long period of watching I saw that the mandibles of the bills were definitely crossed. The legs were yellowish-green.

On the following morning I returned to the spot and again watched the birds for some time, confirming all the above points but noting nothing fresh. During the afternoon I again watched them and heard one of the birds sing. I should describe the song as a fairly long trill followed by several rather harsh Chaffinch-like "twinks." During these observations I saw several flights which were undulating. I have no doubt that the birds were Two-barred Crossbills (*Loxia leucoptera bifasciata*). All the observations were made through x8 glasses at distances varying from 10 yards to 30 yards.

J. O. OWENS.

"ANTING" OF CHAFFINCH.

On June 26th, 1948, my attention was drawn to the behaviour of an adult male Chaffinch (*Fringilla cœlebs*) on a flagstone terrace near Looe, Cornwall. The bird was grovelling, in the attitude of a dust-bathing sparrow, on the site of a well known and active nest of a small ant (*Lasius niger*); it repeatedly picked ants off the flagstones in its bill and placed them among the feathers of its back and beneath its wings. It was accidentally disturbed and flew off.

A. R. LONGHURST.

DISPLAY OF YELLOW BUNTING.

On June 12th, 1948, I stopped my car to watch a pair of Yellow Buntings (*Emberiza citrinella*) 15 yards ahead in the middle of a cart track. The male bird was walking about, not hopping, round an apparently inattentive female from a distance of a few feet away to within a few inches, mostly with his back turned. The male had his head pointing upwards with the beak vertical; the wings were raised and half opened in the "lectern position," the tail half spread and drooped so that it touched the ground. Thus, the yellow throat, the russet rump and white outer tail-feathers were conspicuously displayed.

After about $1\frac{1}{2}$ minutes the male suddenly flew from a distance of about two feet straight to the female and would have landed on her had she not moved away 2-3 inches; he immediately adopted the display attitude, exposing the throat at very close quarters and not attempting to turn round. The female remained, observant, until both birds flew off about a quarter of a minute later. There was no conspicuous shivering of the wings nor was the crest prominently displayed. This appears to be a less casual type of display than indicated by *The Handbook*.

J. F. MONK.

[This account should be compared with those of P. F. Yeo and E. M. Cawkell in *Brit. Birds*, Vol. xl, pp. 211-2, which are more recent than the brief *Handbook* description.—EDS.]

CALL OF YELLOW BUNTING.

THE *Handbook* records the single "twick" note but not the "twickchee" call of the Yellow Bunting (*Emberiza citrinella*). I first noted this call in May, 1946, and have since heard it frequently in practically every month.

On each occasion when the calling bird has been sexed it has been a male. The call can be imitated by uttering "twick," whilst taking a breath, and breathing out a "chee" note, after a slight pause. It is delivered regularly about twelve times a minute, from a perch (usually the top of a hedge, but also recorded from 15 to 30 feet above the ground in ash and oak trees, and on horse-droppings in a field) and in flight. When delivered in flight a number of the "chee" notes are often omitted. I have only once heard the "chee" notes uttered regularly without the "twick" note. Occasionally the "chee" note is varied to "choo" though never in the same session.

Although I have not heard this call elsewhere in Britain, I cannot believe this common call is peculiar to south-west Derbyshire.

DEREK C. HULME.

HOUSE-SPARROW PLUCKING FEATHERS FROM
PIGEON.

THE following observation was reported to me by a friend for whose integrity as an observer I can vouch.

In Russell Square, London, during the first week of June, 1948, a small party of House-Sparrows (*Passer domesticus*) and London pigeons were feeding together on the ground. A hen sparrow was seen to sidle up to and attempt to peck at the side of one of the pigeons. The latter avoided the attack by making a short fluttering dash forward along the ground. Again the sparrow approached and this time succeeded in grasping a beak full of flank feathers. The pigeon again attempted "avoiding action", but the sparrow held on and was seen to give a deliberate tug. At this a small number of the pigeons' feathers was detached. Two or three blew along the ground; these the sparrow collected and with the little bunch of feathers in her beak she flew up to a building near by. The pigeon continued feeding.

This appears to be a deliberate act of plucking feathers from a living bird for the purpose of lining the nest. LESLIE BAKER.

[For a similar incident see *antea*, Vol. xl, p. 275. It will be recalled that we recently published (p. 64) a letter on House-Sparrows pursuing Domestic Pigeons, but this did not refer to attempts at plucking feathers and the author, Mr. Derek Goodwin, expressly mentioned that he had never observed such attempts.—EDS.]

PIED FLYCATCHER IN SURREY IN BREEDING-SEASON.

ON May 9th, 1948, in Windsor Great Park, Surrey, we were puzzled by a song coming from some distance away. We followed up the song and eventually came on the bird perched on the low branch

of an oak. The upper-parts were jet black shading into dark brown on the lower back and tail. The forehead, under parts and wing-bar were white—an undoubted Pied Flycatcher (*Muscicapa hypoleuca*).

The area chosen by the bird was covered with small oaks with a scrubby undergrowth. A gentle slope led down to a small, quick running stream. Until June 13th it was watched daily. The branch on which we first saw it was evidently the centre of its territory. Near by were several holes which were inspected by the bird on several occasions as possible nesting-sites; one in particular appeared to be highly favoured as we saw the bird in and out of it several times.

On May 24th and several subsequent days I witnessed several chases in which another brown bird was involved. After each chase the Pied Flycatcher returned to its singing post and, before bursting into song, puffed out its feathers, stretched up its head and displayed the brilliant white of its under-parts to perfection.

Towards the end of the first week in June the song became spasmodic and diminished, while the bird frequented the tree tops. It was last seen on June 13th high in the tree tops.

Although we watched carefully (Messrs. D. J. May and A. Manning also observed the bird) we saw no sign of a female, but the male had undoubtedly taken up territory in preparation for the arrival of a mate.

J. O. OWENS.

VARIATION IN SONG OF WOOD-WARBLER.

A male Wood-Warbler (*Phylloscopus sibilatrix*) that I had under observation, during the 1948 breeding-season in Surrey, sang regularly a version of the song quite new to me. The bird was mated and was uttering the infrequent, abbreviated edition, with almost complete absence of the second phase, as opposed to the vigorous efforts, in both phases, of the unmated male. The opening ripple was quite normal, but the following trill, instead of being continuous and unbroken, was rendered usually in five (occasionally four or six) short, staccato bursts, with a distinct pause between each. The length of the song, from start to finish was normal.

H. J. HOFFMAN.

GREEN WOODPECKER "DRUMMING" ON METAL CAP OF ELECTRIC PYLON.

ON May 2nd, 1948, Mr. A. Sunderland, a farmer in the Hebden Bridge district of Yorkshire, was awakened at 6.30 a.m. by an unusual tapping sound. The sound was heard again on several subsequent mornings and was eventually traced to a bird tapping on the circular metal top of an electric pylon. Mr. Sunderland asked me to identify the bird and I found that it was a Green Woodpecker (*Picus viridis*). The bird clung to the top of the pole, just below the cap, and by tapping on the metal it was able to produce a sound like that of an automatic drill, audible at

a distance of five to six field-lengths according to the direction of the wind. Between bursts of tapping intervals would elapse varying from a few seconds to five minutes, during which the bird stared about it as the reply of another was "yaffeled" from a wood near by. On some days this went on intermittently throughout the day from dawn to dusk. The woodpecker made use of three different pylons for this performance, in which it appeared to take considerable pleasure.

F. DEAN.

AN UNDESCRIBED NORMAL PLUMAGE VARIATION OF THE DRAKE MALLARD.

IN the course of the past few seasons I have examined a large number of drake Mallard (*Anas platyrhyncha*) in full plumage and I was surprised to find several with terminal spots of black on the feathers of the chestnut-brown breast shield, so that the breast had a distinctly spotted appearance. There is no mention of any such plumage in *The Handbook of British Birds*, Millais's *Natural History of British Surface-feeding Ducks* or Phillip's *Natural History of the Ducks*. I exhibited two of these examples at the meeting of the British Ornithologists' Club on June 30th, 1944, and, since then, I have been able to gather more information. The following table shows the numbers of spotted drake Mallard I have been able to examine.

Locality				No. of Spotted	Total Examined	% Spotted
Europe	...	...	...	10	150	6.6
Greenland	...	...	...	8	8	100.
Iceland	...	...	...	5	6	83.
U.S.A. and Canada	...	...	...	6	21	28.6
China and Japan	...	...	...	2	13	15.
India	...	...	...	0	20	0.

The table clearly demonstrates that the black spotting on the breast shield is a normal plumage variation of the Mallard and, indeed, takes the form of a cline, with the incidence at its highest in Greenland and Iceland and with a diminishing incidence east and west to India.

In Greenland, the spots form part of the distinguishing characteristics of the Greenland Mallard (*Anas platyrhyncha conboscas*). At one time, I wondered if some of these examples from Britain could be migrants, but this is not so. The Greenland Mallard is said to be non-migratory and to live much more by diving than other Mallards and Schiöler has demonstrated adaptations in the sternum of the Greenland Mallard which tends to approach that of a diving duck in structure. I have been able to examine the sternum of one of the spotted variations from the Wash and it is exactly comparable in measurements to the sternum of other normal drakes from Britain. It seemed possible that the eggs of the Greenland birds might have been imported from other countries and that the spotted

examples were due to cross-breeding of the Greenland birds with the local stock. However, the widespread distribution of such examples makes this unlikely and I cannot discover that any Greenland eggs are exported.

To conclude, a previously overlooked variation in the normal plumage of the drake Mallard has been described—see photograph, plate 22. It is widespread, but the incidence appears to vary in different parts of the world.

I am grateful to the British Museum, Natural History, for the use of specimens. I also wish to thank Mr. Colin McLean, Mr. Peter Scott and Dr. J. M. Harrison for their advice.

JEFFERY G. HARRISON.

WOOD-SANDPIPER IN DEVON.

ON August 17th and 18th, 1948, a small wader frequented a piece of flooded grass on the marshes on the west side of the River Axe near Seaton, Devonshire. It allowed an approach to within about 20 to 25 yards, and when flushed usually flew around slowly between 50 and 100 feet high, frequently uttering a three-syllabled rather high-pitched note before making off; and once it pitched in again in almost the same place, giving an excellent view of the spread tail when pitching. Under these circumstances it offered an excellent opportunity for careful examination through x 8 binoculars, and I am confident that it was a Wood-Sandpiper (*Tringa glareola*). It appeared perhaps a little larger than the Common Sandpiper (*Actitis hypoleucos*), but was clearly a sandpiper and had the usual sandpiper habit of employing an up and down motion of the tail and hinder part of the body. The back and upper-parts appeared dark grey-brown very much speckled with white, the head, neck and upper-part of the breast merging into much lighter grey-brown and with a distinct light eye stripe; under-parts off white. On the wing it revealed absence of white wing bar, but showed white rump, and tail white faintly barred brown; under-side of wing off white. Bill appeared dark brown. Legs when standing were hidden by grass. A. L. W. MAYO.

AVOCET IN NORTHAMPTONSHIRE.

WHILE we were at Peterborough Sewage Farm on May 17th, 1948, at 19.30 hrs., G.M.T., an Avocet (*Recurvirostra avosetta*) calling loudly its liquid "klu-eep", dropped on to the bed on which we were watching, at no more than 40 yards distance. Though the light was just beginning to fade all details were visible through 25x telescopes and the identification was quite certain.

This bird appeared to have just arrived, since it was not seen on the same morning and was very wary. It began to feed with the characteristic energetic side to side movement of the head, the bill skimming the water. This was followed by preening of the wing feathers alternating with the dipping of the beak into the water.

The bird was seen in flight and the striking black and white plumage and long legs were also seen at full advantage.

It was seen again at 10.30 hrs., G.M.T., on the following day, May 18th.

J. PARKER. F. G. GREY, AND J. C. COULSON.

STONE-CURLEW IN CHESHIRE.

THE Stone-Curlew (*Burhinus oedipnemos*) is a rare vagrant in Cheshire; Coward in *The Fauna of Cheshire* gives one undated record of a bird shot many years ago near Chester.

On August 8th, 1948, whilst we were watching birds on Altrincham Sewage Farm, Cheshire, we had the good fortune to see a Stone-Curlew in flight with a flock of gulls. The characteristic wing-pattern was very noticeable, and the general sandy-brown appearance and slow, sometimes gliding, flight were also noted.

The bird was seen independently later in the day by C. A. Milner, who is familiar with the bird in Norfolk and was also certain of the identification; it flew off to the south while he was watching.

JOHN SOUTHERN AND ROGER WHITTENBURY.

SABINE'S GULL IN WORCESTERSHIRE.

AT about 1100 hours G.M.T. on August 15th, 1948, I had the good fortune to observe an adult Sabine's Gull (*Xema sabini*) at Upper Bittell Reservoir, Worcestershire.

I was initially impressed by the small size of the gull when compared with a Black-headed Gull (*Larus ridibundus*) also flying around the reservoir. The flight was also airy and tern-like.

By far the most characteristic plumage feature was the wing pattern, details of which were noted as follows: Primaries and a broad band along the leading edge of the wing, black, with conspicuous white mirrors on the outer primaries. A triangular patch of white on the secondaries. Otherwise, the rest of the wing, like the mantle, was clear pale grey. The noticeably forked tail was white, as was the rest of the plumage except for a complete but very narrow blackish collar, which shaded into greyish on the nape and ear-coverts. However, the head as a whole appeared whiter than the figure of the adult in winter plumage in *The Handbook*. The bill was black, with a pale yellowish tip, but the legs were not seen clearly enough to determine their colour accurately.

This bird flew around the reservoir for about ten minutes, occasionally swooping down to the water level to pick up food off the surface, whilst still in flight. It finally flew off in a S.W. direction. Although I remained for about two hours in the vicinity, there was no further trace of it.

These observations were made using x 6 Goerz binoculars at ranges as close as 25 yards. The light at the time was moderate to good. The weather was cool and showery, with the wind S.W., force 5-6 Beaufort Scale.

I am aware that this species is very rarely noted inland in this country, but it seems reasonable to assume that the unusual weather conditions at the time contributed to this occurrence.

I might add that I have watched the Little Gull (*Larus minutus*) a few times on the Continent, and am reasonably familiar with all plumages of the Kittiwake (*Rissa tridactyla*). A. R. M. BLAKE.

GREAT SKUA IN LANCASHIRE.

ON March 25th, 1948, whilst watching a flock of about 30 Herring-Gulls (*Larus argentatus*) feeding in the newly-turned earth at Marton, near Blackpool, about $2\frac{3}{4}$ miles from the sea, I was surprised to see a very dark brown gull-like bird apparently feeding with the others.

I made the following notes:—Short tail, white flash on wing, flight heavy compared with Herring-Gull. On looking up *The Handbook* my suspicion that the bird was a Great Skua (*Stercorarius skua*) was confirmed. I watched it for about half an hour and subsequently found it swimming on a large pond close to the ploughed field. It swam around dipping its head into the water and “washing” itself for about ten minutes. It then flew to the bank of the pond and preened. I now noticed the bill, the upper portion being very decurved and projecting hook-like beyond the lower mandible.

J. VICTOR MORLEY.

BEWICK'S SWANS IN SCOTLAND IN SEPTEMBER AND IN SUMMER.—

In connexion with Mr. N. W. Moore's note on a Bewick's Swan (*Cygnus bewickii*) in Shetland in September (*antea*, Vol. xli, p. 215), Mr. M. F. M. Meiklejohn informs us that on September 6th, 1937, he observed a pair of Bewick's Swans on Loch Indaal, Islay. They had not been present on the day before and so had presumably just arrived from farther north. In this connexion it is worth recording that we have been informed by Mr. Eric Andrew that a single Bewick's Swan frequented the vicinity of the Pow Burn near Monkton, Ayrshire, at least from April 18th to July 28th, 1947. It had gone by August 14th.

AGGRESSIVE BEHAVIOUR OF TERN ON MIGRATION.—Mr. A. Reaveley Jenkins informs us that a Common or Arctic Tern (*Sterna hirundo* or *macrura*) seen by him at the Wilstone Reservoir, Tring, on July 13th, 1948, stooped at him from a height of about 30 feet, swerving off within a few feet of his head, in a similar manner to that of birds on the breeding-ground. It circled round and repeated the attack and finally, some minutes later, circled the reservoir gradually gaining height until it was lost to view in a south-westerly direction.

ARCTIC TERNS NESTING SINGLY.—Mr. C. F. Tebbutt reports that on July 9th, 1948, in Co. Donegal he came across three instances of nests or young of Arctic Tern (*Sterna macrura*) on sandhills or shingle a mile from the nearest other nest. In the *Report of the Cornwall Bird-watching and Preservation Society for 1946* (p. 43) attention is drawn to the apparently not infrequent occurrence of isolated nests of the Common Tern (*Sterna hirundo*) in Scilly, so that the habit is possibly less infrequent than might be supposed.

LITTLE TERN IN HERTFORDSHIRE IN JUNE.—Mr. A. E. Nickels sends us details of a Little Tern (*Sterna albifrons*) which he saw at the Marsworth Reservoir, Tring, on June 27th, 1948. June dates for this species inland are unusual.

KITTIWAKES IN CAMBRIDGESHIRE AND HERTFORDSHIRE IN MAY AND JUNE.—Mr. D. G. Andrew informs us that on May 20th, 1948, he had a good view of an adult Kittiwake (*Rissa tridactyla*) at the Cambridge Sewage Farm, resting on a flooded bank in company with a number of Black-headed Gulls (*Larus ridibundus*). The bird appeared perfectly healthy and was quite ready to fly when approached. It evidently left in the course of the day.

Mr. A. Reaveley Jenkins also sends us details of an immature Kittiwake which he saw at the Startopsend Reservoir, Tring, on June 5th, 1948, and again, in company with Mr. H. H. S. Hayward, on June 6th.

Though single Kittiwakes are not very rare inland in autumn and winter, May and June occurrences are unusual.

LETTERS.

BIRD RINGING IN AFRICA.

To the Editors of BRITISH BIRDS.

SIRS,—I have the pleasure of informing you that the S.A. Ornithological Society has just started a ringing scheme for the study of bird migration and other problems. Rings have been made locally in the same sizes and according to the same specifications as those used by the British Trust for Ornithology. The address selected is "Zoo Pretoria." I am not sure how this scheme would fit in with that envisaged by Messrs. Elliot and Meiklejohn in their letter published in *British Birds*, Vol. xli, p. 63, but it will doubtless be of interest both to them and to the Chairman of the Bird Ringing Committee to know of this development. We shall be glad to co-operate with them fully.

Rings may be obtained on application to me. They are being charged for at 7/6 per 100, but persons ringing more than 100 birds in a year will be issued with the additional rings free. I shall be glad to supply any of your readers with any further information they may require.

This scheme was made possible through the generosity of the Trustees of the South African Bird Book Fund.

T. CAMPBELL, *Hon. Secretary.*

South African Ornithological Society, P.O. Box, 413, Pretoria.

DISPLACEMENT EXPERIMENTS WITH MIGRATORY BIRDS.

To the Editors of BRITISH BIRDS.

SIRS.—The Dutch Ornithological Station "Vogeltrekstation Texel" has made a study of the orientation capacity of migratory finches and Starlings over a period of more than 15 years. Recoveries of ringed birds established the fact that finches which cross the Netherlands in October in a W.S.W. direction belong to the Scandinavian breeding population and pass the winter in the British Isles. The Starlings crossing the Netherlands in October in a more W. direction have their winter quarters in the British Isles too. These birds belong to the population breeding round the southern part of the Baltic.

Now a number of experiments has established that migratory birds possess an accurate sense of direction. Still unsolved is the problem whether this sense is a "compass-sense" (Kompasszinn) or a "sense of location" (Ortsinn); in the first

case the birds keep to the same fixed direction independently of the place where they find themselves; in the second case the birds strive to reach a certain place (their winter quarters) and always direct their flight to this place.

The question can be solved by displacing the birds out of their normal migratory route and studying the course of their flight subsequently.

The "Vogeltrekstation Texel" has performed such a displacement experiment in October of 1948 with finches and Starlings mentioned above. The migrants have been caught near the Hague (den Haag) in the Netherlands on their way to the British Isles and have been transported to Basel in Switzerland, a place lying far S.E. of their usual winter quarters. If the birds maintain their normal direction after release they will cross central France; if they have a sense of location they will try to reach England.

The success of these displacement experiments depends entirely on the number of observations and recoveries coming in. Therefore, to facilitate recognition and to increase the number of observations the birds have been coloured asymmetrically with yellow dyes. Adult birds have been given a yellow wing on the left, immatures a yellow wing on the right side. Moreover the birds are marked with a numbered metal ring of the Museum of Natural History, Leiden, Netherlands.

Now we request the co-operation of English ornithologists to keep a sharp look out for these birds and to send up their observations to:—

H. KLOMP, Head of the Vogeltrekstation Texel, Zoological Laboratory, Kaiserstraat 63, Leiden, Holland.

[We regret that publication of this Letter has been delayed, but no doubt readers will report any such birds.—EDS.]

REVIEW.

British Birds. By Wilfred Willett. (A. & C. Black, London, 1948) 8s. 6d.

This is a book for beginners and, we are told, "is designed primarily to assist in distinguishing different birds from one another." The design is a curious one. The book is not a pocket book nor is it a convenient work of reference. The birds are grouped together in discursive chapters and often in rather strange company, the Hedge-Sparrow, for instance, appearing among the finches and buntings, but there is no guide to enable the beginner to decide which chapter to consult. Even the illustrations by Mr. Roland Green, many of them familiar, are not particularly helpful, as they appear to have been chosen at random and are not always inserted at the relevant point. When the reader has eventually located a species he may not be rewarded by really adequate information. In the chapter on gulls, for instance, he will find that the Black-headed Gull has "red legs and bill, which makes identification easy," but he will not learn that this species has a broad white line along the front of the wing which, incidentally, makes identification easier still. Unfortunately this is not an isolated instance; many of the descriptions are too vague to be convincing and a few are definitely misleading.

Mr. Willett acknowledges the help and guidance of *The Handbook* and has, on the whole, made good use of it, though the statement that shrikes spike their captures on thorns "not so much to stock a larder as the best means to dismember their prey" is surely a misunderstanding. *The Handbook*, however, is a highly condensed work; further condensation leads to such statements as that "Razorbills breed . . . on the north coast as far south as Yorkshire and also again in the Isle of Wight," or, of Leach's Fork-tailed Petrel, that "it nests in some islets off our coasts." A half truth of this sort may be just as misleading as the statement that the Black Redstart is "seen only in autumn and winter," which is surprising in a book published in 1948.

It is a pity that there should be so many shortcomings in a book which is evidently the outcome of a genuine love of the countryside and of its avian and human inhabitants. Mr. Willett's enthusiasm should stimulate others to take an interest in birds, but one can think of many more effective ways of doing this than the one which has been adopted.

J.D.W.

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BRITISH BIRDS

NUMBER 5, VOL. XLII, MAY, 1949.

SPECIES AND SUBSPECIES: A REVIEW FOR GENERAL ORNITHOLOGISTS.

BY

B. W. TUCKER.

THERE are good reasons for considering that a review of the concept of subspecies and the use and limitations of trinomial names in a publication circulating widely amongst field ornithologists is desirable at the present time, if not overdue. In the first place the nature of subspecies and of trinomial names is constantly misunderstood by field naturalists. The hazy or actually mistaken notions prevalent on the subject lead to a frequent misplacement of emphasis on subspecific distinctions and to the frequent use of subspecific names in contexts where they are at best inappropriate and at worst actually incorrect and misleading. An endeavour to dispel such misconceptions would be worth while even if it led only to a more correct usage of technical terms. But there is a further consideration which makes the undertaking doubly desirable. The concept of subspecies expresses some quite fundamental principles concerning the process of evolution and the origin of species, some appreciation of which can hardly fail to enhance the interest of the study of birds to any thoughtful observer. These principles are not, in essentials, difficult for a non-scientist to grasp, and the only valid reason for their not being more generally understood amongst amateur ornithologists seems to be the lack of any exposition of the subject specially adapted to their needs. Yet a further reason for making such a treatment available is the fact that the subspecies concept itself is undergoing some modification in the minds of thoughtful systematists, and if the general principles underlying it are worth an effort to understand, some awareness of these current trends of thought and research on the subject is no less desirable if the real significance and proper place of subspecies in ornithology are to be understood.

The use of trinomial scientific names in *The Handbook of British Birds* and the present journal and in other standard works, as well as in most of the local ornithological reports, has led the majority of amateur observers, even if they do not carry the scientific names of the various species in their heads, to take them more or less for granted when they see them and indeed to use them habitually when publishing their observations. This taking for granted of what is in fact an essential instrument in the scientific study of animals is no doubt better than regarding it as a rather frightening and pointless jargon (a view more prevalent amongst amateurs formerly than now), but it may be suggested that there is now a general tendency

amongst field workers to take trinomial names *too much* for granted and to assume that their use is necessary and desirable in circumstances where in fact quite the reverse is the case. The grounds for this statement will become apparent as we proceed and we shall return to it more specifically at a later stage.

THE PRINCIPLES AND HISTORY OF TRINOMIAL NOMENCLATURE.

For the benefit of those who may be new to the subject it will be desirable to begin with certain elementary considerations about nomenclature which will be commonplace to a good many readers who may nevertheless find themselves on less familiar ground in what follows.

Every species of animal or plant is designated scientifically by a binomial name, that is to say by a name in a Latin or supposedly Latin form consisting of two terms. All organisms believed to be intimately related to one another are placed in the same genus. For all members of the same genus the first term in the scientific name is the same, while the second term indicates the particular species referred to. Thus the Raven, Carrion Crow and Jackdaw are called *Corvus corax*, *Corvus corone*, *Corvus monedula* and so on. This is the system of nomenclature devised by the great Swedish naturalist Carl von Linné or Linnæus in the middle of the 18th century and soon universally adopted by zoologists and botanists. The need for some such simple and precise system of naming for the purpose of communication between scientists is obvious, since not only do the vernacular or popular names of animals differ from country to country, or even in different parts of one country, but a vast number of species, especially of the smaller and more obscure kinds, have no popular names in any language.

This simple system is still entirely adequate for many purposes. But towards the close of the 19th century, as a result of a closer and more systematic study of skins in museum collections, ornithologists began to appreciate the fact that populations of the same species of bird are often not identical throughout the range of the species. In one region they may be, for example, a little darker or a little lighter than in another or they may differ very slightly in size, as indexed chiefly by accurate measurement of the length of the wing. These slightly different geographical forms or races within the species are what are nowadays generally called subspecies and it will be appreciated that the terms subspecies and geographical race are absolutely synonymous. In order to define these races conveniently the system of trinomial nomenclature was introduced in America. By this system the subspecies is designated by adding a third term to the scientific name. In any species with recognized subspecies there is always one of the latter, often called the typical form, in which the subspecific name merely repeats the specific one (e.g., *Corvus corax corax* or, more conveniently, *Corvus c. corax*), but it may be stressed in passing that the designation of a particular race as the

typical form carries with it no implication whatever that it represents the central or basic stock of the species ; it merely means that this race was the first to be described in accordance with the rules governing scientific nomenclature, or rather, in the great majority of cases, that the species name was first applied to birds of this particular race*

The recognition of subspecies in this country, and indeed in Europe, in the period preceding the first Great War, was due primarily to Ernst Hartert, the eminent German systematist who was Curator of Lord Rothschild's museum at Tring, but he was ably and actively supported by H. F. Witherby and others in the face of not a little disapproval from ornithologists of the older school. Hartert applied the subspecies principle in his systematic treatment of the birds of the Palæarctic region in his great work *Die Vögel der Paläarktischen Fauna* and proceeded to show that the British populations of a number of familiar birds were subspecifically distinct from those of the Continent. Actually his opponents were foredoomed to failure, for they themselves recognized certain subspecies, such as the St. Kilda Wren and the Irish Coal-Tit (*Troglodytes t. hirtensis* and *Parus ater hibernicus* of modern terminology), whose characters were too pronounced to be ignored, but had been forced to treat them as distinct species, since they recognized no other systematic category to which they could be assigned ; while other unusually well-marked subspecies such as the Pied and White Wagtails (*Motacilla alba yarrellii* and *a. alba*) had been recognized (and regarded as species) from the earliest days of systematic ornithology. In 1912, Hartert and Witherby collaborated with F. C. R. Jourdain and N. F. Ticehurst in the production of *A Hand-list of British Birds*, in which the trinomial system was adopted and the importance of subspecies emphasized by the application to them of English, as well as scientific, names, such as Continental and British Hedge-Sparrow, Continental, British and Irish Coal-Tit and so on. This work was the predecessor of the *Practical Handbook of British Birds* and the present *Handbook* and fixed the treatment of subspecies in British ornithology for more than a quarter of a century.

* It may be added that in a full scientific designation the subspecific name, or the specific name if only this is used, is followed by the name of the author who originally introduced the name or often by an abbreviation of the author's name if he is well-known, e.g., Linn. or L. for Linnæus. Where the original authority of the specific or subspecific name placed the animal in a different genus from that now used his name is placed in brackets, but where he used the same generic name as at present employed brackets are omitted. Thus the Raven is *Corvus corax* Linn., because Linnæus actually placed the Raven in his genus *Corvus*, but the Jay is *Garrulus glandarius* (Linn.) because later systematists have removed the Jay from the genus *Corvus*, in which Linnæus placed it, to a new genus. This point in the technique of nomenclature does not primarily concern us here, but seems worth mentioning because the significance of the use or omission of brackets is so often misunderstood. The citation of the author's name may be necessary in taxonomic discussions to avoid ambiguity and is also customary in formal species lists, but is otherwise usually omitted.

SPECIES AND SUBSPECIES.

From what has been said above it will be seen that a species may be thought of as consisting of a number of regional stocks or populations differentiated from one another in various minor ways. Where such differences are considered sufficiently pronounced and sufficiently constant by competent systematists (and also unfortunately sometimes by incompetent ones) they are defined by the use of trinomial names as already indicated.

It should be appreciated that while the differences between even closely similar species in any given region are normally clear-cut and definite the differences between subspecies are in general of a much less precise kind. Thus, no ornithologist who is in any way competent to judge has any doubt that the Marsh-Tit and Willow-Tit (*Parus palustris* and *atricapillus*), for example, are distinct species in spite of their great similarity; they are separated by perfectly clear-cut distinctions of plumage, voice and breeding habits. This is true as a general statement with regard to closely allied species; the species has an objective "reality" in nature which the majority of subspecies do not possess.

This last statement requires amplification to make the situation clearer. When two stocks of a species are isolated from one another by a well-defined physical barrier such as the sea there may be no intergradation between them. Interchange between an island population and that of the mainland, even in the case of flying organisms such as birds, may be reduced to such negligible proportions, or in other words the degree of isolation between them may be so nearly complete, that the two stocks have been able to differentiate in complete independence, resulting in a clear discontinuity between them in respect of the distinguishing characters of colour or size, so that the origin of any specimen of unknown history can be determined with reasonable certainty. This is by no means always the case and in respect of the racial forms of the British Isles is less consistently true than used to be supposed, but in general the tendency of island races to be more or less sharply separated in their characters from their nearest neighbours of the same species on the mainland or other islands is quite evident. The same is true of races of a mountain species separated by a broad region of lowland. On the other hand over large continental areas there are frequently no barriers of major importance, so that free interchange amongst neighbouring populations is nowhere seriously hampered. In such areas the same tendencies to geographical variation that we have noted above may be at work, so that "good" subspecies may be recognized, but the ranges of these are nowhere defined by sharp boundaries. Such subspecies may be, and commonly are, marked by considerable constancy in their characters over wide areas, but these areas of approximate uniformity are separated by transitional zones or zones of intergradation in which the populations are intermediate in character—in which, in other words, one subspecies

grades into another. Here the simple system of trinomial nomenclature breaks down, since birds of such intermediate populations cannot be properly assigned to one race or the other. They can only be designated by some such convention as the use of a special sign linking two subspecific names, e.g., *Prunella modularis occidentalis* > *P. m. hebridium*, meaning Hedge-Sparrows intermediate between the British and Hebridean races.

CLINES.

The situation in which a species can be split up into a number of subspecies each with tolerably constant characters, though common, must not be supposed to represent the only possible form of geographical variation. It may on the other hand be found that the characters of a species alter gradually and continuously over a wide region, even across its whole range, such a gradation being conveniently defined by the term "cline" introduced by Huxley. Actually the ideally simple situation where there is a steady and uniform trend over the whole or a large part of the animal's range is probably seldom realized. More commonly there will be some regions where the change is more rapid than in others, a condition usually expressed by speaking of "stepping" of the cline. Where the "steps" are sufficiently definite they can be regarded as separating namable subspecies and evidently there is every gradation between the type of subspecies situation taken above as typical and the cline with no sufficient irregularities to warrant splitting it up into named forms.

Clines occur not only in characters common to all (or nearly all) individuals of a species, but in the relative frequency of characters which are found in some individuals only. An excellent example of the latter type is provided by the so-called bridled variety of the Common Guillemot (*Uria aalge*). The work of H. N. Southern on the distribution of this variety is widely known amongst field ornithologists and it need only be recalled that in the eastern Atlantic area there is a general tendency to increase of bridled individuals in the population from south to north, from one per cent. or less in southern Britain and the neighbouring coasts of Europe to over 50 per cent. in part of Iceland (Southern and Reeve, 1941). The geographical variation in the frequency of the dark and light phases of the Arctic Skua (*Stercorarius parasiticus*) is another well-known example, also studied by Southern (1943).

Character gradients of the kind in question have long been known to systematists, but their widespread occurrence and biological importance have been hardly sufficiently appreciated until recent years. Undoubtedly some supposed subspecies to which names have been given really only represent arbitrarily selected points on clines—selected, that is, not by any deliberately arbitrary procedure but by accidents of collecting. This is understandable enough in relatively inaccessible regions for which material may only be available from a few areas or localities, but there is little excuse for it in Western Europe, and it must be admitted that even responsible

systematists have sometimes been too ready to apply new subspecific names before comparative material from other parts of the range was really sufficient for the status of the supposed new form to be properly assessed.

There is in fact no standardized taxonomic procedure in the treatment of clines, even where their existence is recognized. Cases could be quoted of deliberate application of subspecific names to arbitrary stages in a recognized cline. It is difficult to find any excuse for such a proceeding, since it clearly misrepresents the actual facts. Perhaps more debatable is the question of the desirability of marking the end stages of a cline by giving them trinomial names. Where in fact gradation is continuous so that the range of the named terminal stage cannot be defined it is the writer's view that such naming serves no good purpose and indeed is misleading. It is far better in such cases to treat the birds of the whole area involved as a single subspecies showing an internal cline in respect of certain characters—or supposing a cline with no clear “steps” or discontinuities anywhere to extend over the whole range of the species, to admit no named subspecies at all.

There are other, and still unsolved, difficulties in the nomenclatorial treatment of clines, one of which is that characters often vary independently, so that a cline in one character need not coincide with a cline in another, but they cannot be examined in detail here.

From what has been said so far, it will already be apparent to the reader that the subspecies or geographical race is something much less definite, much less “objective,” than the species. The colour and other differences on which subspecies are defined are real enough, but the splitting up of a species into named subspecies is to a large extent a matter of classificatory convenience. The question whether the characters of a particular population are sufficiently pronounced and sufficiently constant to merit the conferring of a subspecific name depends largely on personal judgment and competent systematists will not always agree. Moreover, however intelligently and critically the division of a species into subspecies is carried out there will always be a not inconsiderable number of individuals which cannot be assigned to any one race for reasons already made clear. “The terminology of the taxonomist,” as Mayr (*Systematics and the Origin of Species*, p. 102) has pertinently observed (and we could as well read “trinomial nomenclature”), “. . . is always an idealization and represents the facts as simpler than they are.”

It must not be imagined that to recognize this is to imply that the practice of defining and naming subspecies is unsound. On the contrary, as we shall see more fully in the following sections, it is an essential weapon in the study of geographical variation and the processes by which species originate, but in using any instrument, however valuable, it is important to recognize its limitations as well as its capabilities.

(To be continued).

THE IMMIGRATION OF AMERICAN PECTORAL SANDPIPERS IN THE AUTUMN OF 1948.

IN the autumn of 1948 what might almost be described as a miniature invasion of American Pectoral Sandpipers (*Calidris melanotos*) occurred in Great Britain. As recorded below, birds were reported from nine different localities. It is natural to enquire whether such an event can be related to anything unusual in wind or other conditions, but it is difficult to arrive at any definite conclusion owing to the surprisingly scattered nature of the occurrences both as regards date and place. The Pectoral Sandpiper breeds in north-eastern Siberia as well as in Arctic America and has been met with, though not positively proved to breed, as far west as the Taimyr Peninsula. It may be noted that the Taimyr is the nearest regular breeding-ground of the Knot (*Calidris canutus*), which visits Western Europe in great numbers, and this raises the question whether some of the Pectoral Sandpipers visiting the British Isles may not come from Siberia rather than across the Atlantic from America. This supposition gains some support from the fact that there are about twice as many records for the eastern part of England as for the west, though it should be borne in mind that East Anglia and Sussex, which provide about two-thirds of the eastern records, are well worked areas; while the fact that ten (or about half) of the records from the west are from Scilly seems to leave no reasonable doubt that some, at any rate, do come from America, a conclusion strongly reinforced by the several occurrences in the west of Ireland and the virtual absence of records from the Continent.

In the 1948 immigration it will be noted that the earliest record (Aberlady, August 10th) was on the east side of Great Britain, but this was nearly three weeks earlier than any other and might possibly have represented a separate arrival. The later records, beginning on August 29th (when the birds were reported from Cornwall and East Sussex), are, as observed above, so scattered that it seems impossible to base any conclusion on them. We have, however, consulted the Meteorological Department of the Air Ministry, who have kindly informed us that:—

“There were depressions on the Atlantic moving eastward during the few days preceding August 10th and again during the few days preceding the 29th. The conditions were thus more in favour of an eastward flight of the sandpipers from America than of a westward flight from Siberia, but in neither case do the weather charts show anything which would account for the birds being blown out to sea from the American mainland.”

A spring record from Cambridgeshire is also included.

THE EDITORS.

CAMBRIDGESHIRE.

An American Pectoral Sandpiper (*Calidris melanotos*) was present on the Cambridge Sewage Farm from the morning of May 29th to the morning of June 2nd, 1948. It was first seen by D.G.A.,

whose attention was drawn to it by the unfamiliar combination of size—slightly larger than Dunlin (*Calidris alpina*)—the absence of any wing-bar, and the pattern of the tail, whose dark centre contrasted with whitish sides.

On the following day it was watched by all the undersigned at ranges down to 40 yards. The bird appeared to be in breeding plumage; and the two most striking features were the sharply defined dark bib low down on the breast, and the long, broad, pale superciliary stripe contrasting with the very dark crown and nape, and the dark line to the eye. In build it was slender, especially towards the tail. The legs, which were rather longer than in the Dunlin, were brownish-yellow. In flight, which was very strong and often high, it was frequently heard to give a half-trilled "trrup" often repeated several times.

The bird spent most, if not all, of its time in the open, associating with Dunlin, Redshank (*Tringa totanus*) and Ringed Plover (*Charadrius hiaticula*), and was usually quite as shy as the Redshank. One of its most noticeable habits was that of standing stock-still, with neck stretched out.

This record is not only the first for Cambridgeshire, but it would also appear to be the first in Britain in May or June. The identification was later confirmed by many members of the Cambridge Bird Club.

D. G. ANDREW, P. A. J. BALL, R. L. BAXTER, and J. L. TASKER.

An American Pectoral Sandpiper (*Calidris melanotos*) was present at the Cambridge Sewage Farm from October 7th to 10th, 1948. I first saw it at about 15.30 on the 7th, when a good view was obtained at about 80 yards. Later in the day I returned with A. D. G. Smart, but the light was failing and we did not get a satisfactory view on the ground, though once the bird flew round the bed, showing the characteristic tail-pattern and uttering a call—a whistling "chirrip" or "chirrit," resembling that of the Curlew-Sandpiper—which I have come to regard as typical after hearing it at Cambridge in the spring and at Salthouse in the autumn. On the morning of October 8th, I returned with A. S. Thom and P. A. J. Ball and found the bird on the same bed. The light was excellent and with a powerful telescope we were able to confirm the identification and note the characters in detail.

The size was larger than a Dunlin (*Calidris alpina*) but smaller than the smallest Reeve (*Philomachus pugnax*) I have seen. Crown dark brown, lightening to almost buff on lower nape. Conspicuous light or white stripe above eye and stretching back behind it, but not on to the nape. Cheeks buff. Rest of upper-parts gave a speckled appearance, the feathers appearing dark brown or black edged with light or whitish, giving an appearance recalling, though not quite as pronounced as, the back pattern of a Little Stint (*C. minuta*) in autumn. Throat and breast buffish-grey, narrowly but firmly streaked with black and very dark brown, the streaking ending

abruptly on lower breast. Rest of under-parts off-white. Bill just decurved at tip ; in relation to size of bird longer than in a Reeve, but shorter than in a Dunlin. Legs yellow ochre. In flight there was no apparent wing-bar on this bird, although from the one I saw in Norfolk, I gained a *faint suspicion* of one at very close range. Central tail-coverts and tail feathers dark, with white or near white feathers on either side.

The bird was seen by many others during the next two days, but not, to the best of my knowledge, after October 10th.

R. J. FOSTER.

EAST LoTHIAN.

ON August 10th, 1948, an American Pectoral Sandpiper (*Calidris melanotos*) was found at Aberlady Bay by A.D. Watson and it was seen later in the day by J. H. B. Munro, G. L. Sandeman, G. Waterston and the writer. The bird was thoroughly identified and details have been sent to the *Scottish Naturalist*.

A. G. S. BRYSON.

CORNWALL.

ON August 29th, 1948, in company with Mr. E. F. Pearce, I observed an American Pectoral Sandpiper (*Calidris melanotos*) on the Camel Estuary, North Cornwall. As we passed along the salt-marsh by the side of the Amble River channel a smallish wader dropped into the side of the channel.

The bird was somewhat larger than a Dunlin (*C. alpina*), with a shortish bill, blackish except at the gape, where it was lighter. The breast showed very distinct dark streaks on a buffish ground, forming a distinct "breastplate" with clearly defined borders. The wings were long and when folded reached beyond the tail. The legs were yellow ; they appeared to me greenish-yellow, but Mr. Pearce described them as "looking like yellow legs that had got muddy and the mud dried on them."

Both on the first occasion and on our return along the estuary an hour later we put up the bird several times. Each time it called "trit-trit," with a note quite unlike a Dunlin's. We had excellent views at close range of the black-centred tail with very much paler outer tail-feathers, which were either greyish or brownish, with no trace of white. It was very tame and was once observed to catch a mud-worm nearly 2 inches long and take it down to wash at the edge of the water before swallowing. Similar treatment was given to another unidentified invertebrate, and was noted subsequently by other observers.

All the particulars given above agree perfectly with *Calidris melanotos*. The bird was seen at the same place on August 30th by Mrs. Hillier (Miss S. V. Benson) and Mrs. F. E. Carter, who agreed with my identification, and on September 3rd by Mr. E. M. Nicholson and Mrs. H. M. Rait Kerr.

T. J. WILLCOCKS.

THE bird recorded above was observed for a rather brief period by Mrs. H. Rait Kerr and myself on the late afternoon of September 3rd, when an exceptionally high tide unsettled it and it was not seen again. It alighted on the last remaining bit of its favourite area to be left uncovered by the tide and stood there with little motion for about ten minutes, giving a good side view at about 40 yards range with a 40 x telescope and 7 x and 8 x binoculars in fair light against a background of marsh herbage, but unfortunately it never turned so as to permit the front of the breast to be seen, and after flying off low it was not seen again.

The following additional particulars, however, help to confirm the identification. The crown very dark brown; a distinct creamy stripe over the eye; nape finely speckled dark brown on dull earth-brown ground: mantle and wings dull earth-brown with many large blackish and dark brown markings. There was clearly a marked contrast between the buffish upper breast and the white underparts, but for the reason already given it was not possible to make out details or to decide how sharp the line of demarcation was. Legs ochreous yellow and fairly long, but considerably shorter than a Redshank's.

While we were watching it the bird never relaxed, fed or rested, and with its upstretched neck looked like a small elegant Redshank in form. It was distinctly larger and stood much higher than Dunlins and Ringed Plovers present in the same area. In flight no white marks showed on wings or tail. The flight was rapid and darting, not direct, but not swerving or rocketing in exaggerated style like a Green Sandpiper. The call-note on the wing was a brief double chittering or chirping call of moderate volume and without unusual emphasis or penetrating quality, with a perceptible pause between the two sounds and definitely unlike the note of any regular British wader.

During the time that it was present on the estuary it appears to have been invariably solitary, having nothing to do with other waders present. It was usually busy feeding on the open mud in channels running through the salt-marsh, not frequenting the higher parts on which vegetation is plentiful. E. M. NICHOLSON.

NORFOLK.

AN American Pectoral Sandpiper (*Calidris melanotos*) was identified by me at Salthouse, Norfolk, on September 11th, 1948. My attention was first drawn to the bird, which rose with a party of five Dunlins, by its peculiar note and by its larger size. A series of photographs of the bird, taken by Captain R. P. Bagnall-Oakeley and Lieut.-Commander Philip Wayre, accompanies this report and, in view of this, a detailed description is unnecessary, but the following points may be of interest.

In flight, the bird resembles a small Reeve with a broad very dark brown line down the back, rump and tail: remainder of back and rump paler brown. Wings brown without any appreciable

wing-bar : tail fawny-grey except for the very dark brown, slightly elongated, central feathers : the shape of the tail compared with that of the Siberian Pectoral Sandpiper (*C. acuminata*), as depicted in *The Handbook*, was quite evident in flight. Legs yellowish. Bill black or very dark brown, straight and of medium length. Eye black. Breast longitudinally streaked with clearly defined brown markings ending abruptly at the whitish belly and giving the impression of a bib. Rest of under-parts dirty white.

Apart from the bib, the most striking feature of the bird is the head, which has a very striped appearance caused by a single very conspicuous broad white stripe over the eyes extending almost to the nape, while on the centre of the crown there is a very dark brown stripe increasing in breadth from the front to the back and separated from the white eye-stripes by paler brown margins ; seen from the front this gives the impression of three stripes in addition to the eye-stripes. The neck is long and sinuous. The note is unlike that of any British wader and consists of a triple (usually) " trritt-tritt-tritt " rising, and with the emphasis on the " itt ", each " trritt " being clearly separated from the next ; the bird occasionally calls from the ground, usually a single " trritt " and the note is then not unlike that of the Curlew-Sandpiper (*Calidris testacea*). No bobbing was observed.

The bird was invariably to be found in the same place, a boggy grass field largely overgrown with short sea aster and containing a certain number of small shallow freshwater pools. It was observed that while the Dunlin would frequently feed in these pools, the Pectoral Sandpiper practically never did so, seeming to prefer the boggy grassland.

The bird was subsequently watched at very close quarters by Lt.-Col. and Mrs. R. F. Meiklejohn, Dr. B. B. Rivière, Miss D. Steinthal, Mr. R. H. Higgins, Mr. R. J. Foster and Mr. W. Bishop. Unfortunately the bird came to an untimely end. A week later another and clearly distinguishable bird was located on Cley marsh and, at the date of writing this report (October 25th), a third bird has put in an appearance.

A. H. DAUKES.

SUFFOLK.

BETWEEN September 19th and 24th, 1948, frequent visits were made to a flooded meadow half a mile S.W. of Aldeburgh, where large numbers of wading birds were feeding. On most of the visits a bird was seen which, from the notes made at the time, has since been identified by Mr. B. W. Tucker as an American Pectoral Sandpiper (*Calidris melanotos*). The bird was often watched feeding in company with Dunlin (*Calidris alpina*) and Ruffs (*Philomachus pugnax*) at a range of as little as 20 yards, in good light with 6 x binoculars and a 20 x telescope.

The bird was estimated to be one-fifth larger than the Dunlin. The head was rather small, dark on top, and with a dark eye-stripe,

leaving a pale stripe in between. The beak was dark and straight, as long as that of the Dunlin. The back was marked with black and brown much as in a Dunlin, and the breast clearly streaked (especially at the sides) with dark brown, and there was a sharp division between the darker breast feathers and the white lower breast. In flight the rump was centrally very dark, with pale streaks on either side. There were no conspicuous wing markings. The legs were greenish-yellow. Once or twice the bird called in flight, making a rapid "trip trip trip" (about three calls in a second) with a slightly harsh vibrant quality, at a pitch about a sixth below the Dunlin's note. G. C. VARLEY.

NOTTINGHAMSHIRE.

AFTER a large number of duck and various waders had taken flight from a section of Nottingham Sewage Farm on September 26th, 1948, J.S. was particularly struck by the rufous appearance of a small wader feeding with the two or three Ringed Plover left on a wide mudflat, and after working up to within 40 feet, the two writers, with Mr. S. Birchenough, spent almost an hour in obtaining details of what proved to be an American Pectoral Sandpiper (*Calidris melanotos*), apparently an adult still in summer plumage.

The following details were written on the spot, and obtained with the help of 6 x binoculars and 25 x telescope in bright morning sunlight. A slim, graceful wader of approximately the same body length as adjacent Ringed Plover (*Charadrius hiaticula*), but more lightly built and with longer legs, as well as being longer altogether on account of the longish neck and bill. In general outline it much resembled a small finely-built Reeve, especially as it moved about with neck fully extended. The bill was black, shorter proportionately than that of Dunlin (*Calidris alpina*) and was slightly, but quite perceptibly, decurved at the extreme tip. The legs were dullish yellow. The rufous appearance of the back as seen in the distance was seen at close quarters to be due to the rather broad rufous edging to the dark brown centres of the feathers of the mantle and median and lesser wing-coverts. In the closed wing the primaries looked blackish-brown, contrasting strongly with the rest of the visible wing. The top of the crown was conspicuously dark brownish, with some very fine paler streaking. Sides of face were pale whitish-buff with some slightly darker stippling from bill to eye and over ear-coverts, leaving a fairly distinct pale stripe over the eye. Chin whitish. Sides and front of neck, throat and upper breast a buffish-grey, most distinctly marked throughout with small blackish streaks, the area thus coloured and marked coming to an abrupt end on the lower breast, giving place to pure white under-parts. The clear demarcation between these two areas was particularly striking, even at long range when finer detail could not be discerned. When the bird

flew it went into the light, so that little detail was observable, but the centre of the tail was noted as darker than the sides, and the sides of back and rump and the lateral tail-coverts were white. In flight the wings were long and pointed, giving the bird a surprisingly larger appearance than when on the ground.

Call note, uttered in flight, was a quite loud double note written on the spot as "churruc", uttered as a hoarse, slurred chirrup. A shorter single note, written as "churc" was probably a more abrupt version of the same. The bird eventually went up high and off to the S.S.E.

J. STATON AND R. BROOK.

SUSSEX.

WITH reference to my note on two American Pectoral Sandpipers (*Calidris melanotos*) at Thorney Island, Sussex, in 1947 (*antea*, Vol. xli, pp. 186-187) I write to record that another bird of this species was found at the same place on September 26th and October 3rd, 1948. It was seen by 14 observers including Messrs. J. A. Walpole-Bond, J. A. Smith, D. L. Dunkin and G. A. Hebditch and by myself on each occasion. When the bird was first flushed, I at once recognized the low, guttural "chirrup-chirrup", which we had heard the previous year. This Pectoral was never as tame as those seen in 1947, but allowed approach to within about 12 yards before rising. The legs were a green-brown colour and there appears to be considerable variation of leg-colour with this species. The finely-shaped bill was dark brown with a distinct curved tip and lacked the yellow patch at the base of the lower mandible, noticed in one of the 1947 birds. The dark crown, lighter sides of face, white beneath the chin and a not indistinct white eye-stripe could all be seen. The tortoise-shell effect on the mantle was very noticeable and on this bird I was able to see the reversed V effect caused by the light buff edgings to the feathers. The sharp demarcation of the pure white belly from the heavily spotted breast was again characteristic, but I was not struck by the black line down back, rump and tail as in 1947, though this may have been due to the less close approach that was possible. I. J. FERGUSON LEES.

On the morning of August 29th, 1948, we saw an American Pectoral Sandpiper (*Calidris melanotos*) by the Old Channel of the River Cuckmere, Sussex. Our attention was first drawn to the bird by a brief view of its distinctive "gorget" and by its call—a hoarse "cheep, cheep"—as it rose. Later we obtained excellent views of the bird and were able to identify it on the basis of the following features. Size, not very much larger than a large Dunlin (*C. alpina*) and considerably smaller than a Reeve (*Philomachus pugnax*). Fortunately a number of Dunlins and a Reeve were seen feeding near the bird on several occasions and thus comparison of size was easy. The upper-parts were streaked blackish and buffish and had a somewhat rufous tinge. The back was darkest in the

centre and there was a whitish streak on either side. These streaks appeared as an inverted V when the bird was feeding with its head towards us. Close examination showed that the streaked effect was due to the light margins of the feathers. The crown was more heavily streaked than the rest of the head and there was a narrow buffish superciliary stripe. The neck and breast were covered with dark streaks on a buff background. These markings terminated suddenly, leaving the area sharply contrasted with the pure white belly. The legs were dull yellow with a greenish tinge and were longer than those of a Dunlin. The bill was dark with a lighter base. It was slightly decurved and relatively shorter than that of a Dunlin.

In flight the centre of the tail was seen to be dark and somewhat projecting, giving a pointed effect. When the bird was put up at a short distance the sides of the tail were seen to be light grey, but it was not easy to pick out this feature with certainty at a distance. There was a white line visible on either side of the lower back and rump in flight. In certain lights and from certain angles there was a lightish line visible across the wing, but there was nothing approaching a wing-bar. The flight was rather unusual, especially when the bird first left the ground. Sometimes it was slow and soaring, at others extremely rapid. It tended to twist and turn at first, but later became more direct. It usually landed with a prolonged glide.

On the ground the bird stood more erect than a Dunlin, but less so than a Reeve. It often had its neck stretched out and this seemed longer and more slender than that of a Dunlin. On being put up it usually came down again at a short distance, tending to return to the same spot after a short time. On two occasions, however, it rose high and flew off out of sight before returning.

We revisited the area during the afternoon of the same day and then found that a second bird was also present. We had doubtless overlooked this in the morning. One bird was a little larger than the other. The two birds were sometimes seen feeding together, but more often separately. In the morning the bird then seen several times chased away Dunlins which had come too close, and in the afternoon both birds were several times chased by the Reeve when they came near it. About three hours were spent by us watching the birds in the afternoon and on a number of occasions it was possible to get within a few feet of them.

Other observers were informed of the presence of the birds and during the afternoon they were seen by Mrs. M. N. Harber and Messrs. R. T. Brooker, C. M. James, C. St. C. Simmons and B. G. Volk. The birds were seen on August 30th by Mr. G. des Forges and Mr. C. St. C. Simmons and on August 31st by the latter observer. They were last seen by D. H. B. on the evening of September 1st. On September 2nd and subsequent dates they were not found.

JEFFERY H. BOSWALL, DAVID H. BROWN AND D. D. HARBER.

CHESHIRE.

AN American Pectoral Sandpiper (*Calidris melanotos*) was observed at Altrincham Sewage Farm on September 3rd, 1948, and remained for over a week, being last seen on the 12th of the month, and the following details were noted.

Length estimated as $7\frac{1}{2}$ -8 inches, slightly larger and more slender than neighbouring Dunlins (*C. alpina*), with legs relatively longer and bill relatively a little shorter and perceptibly decurved at the tip. Crown dark brown narrowly-edged buff, nape light buff with fine dark streaks, mantle and scapulars black-brown with fine whitish and buff tips, broadly edged yellowish buff, forming two broad lines on either side, converging in a V-shaped pattern with apex towards the tail and especially conspicuous when the bird faced the observer and tilted its body to feed. Chin white, a buffish-white stripe above and behind the eye contrasted with the dark crown; throat, face and breast pale buff, finely but profusely streaked dark brown, terminating abruptly on breast, and sharply defined against the white belly. Rump and centre tail-feathers black-brown, outer tail-feathers greyish brown, sides of rump and lateral tail coverts white, showing in sharp contrast to the dark centre as the bird took wing. In flight an ill-defined whitish wing-bar showed against the blackish-brown primaries and secondaries. Bill dark brown, shading to dull greenish at the base; legs and feet dull yellow.

The behaviour was distinct from that of Dunlin; the bird covered a much larger area of ground when feeding, being almost continuously on the move with occasional short pauses, during which the body was held considerably more erect than normally and head upstretched in a manner recalling that of Ruff. The gait was a fairly brisk walk, with shorter periods of slower, more sedate, progress when feeding, and occasionally running for a short distance at considerable speed. In feeding, it picked from the surface or probed the mud in rapid succession, rarely immersing the beak completely, and turning the body from side to side in a lively energetic fashion. It fed entirely on the mud, not entering the water except to change feeding grounds, keeping mainly to the wetter parts and wandering less frequently to harder ground. It ignored, rather than avoided, Dunlins on the same ground, but tended to avoid some immature Ringed Plover that were intolerant of its close approach and drove it away with some determination. When flushed, it uttered a low husky call "tritt-tritt." The flight was slightly erratic on rising, but soon settled into direct rapid flight similar to that of Dunlin with which it consorted on the wing.

During its stay, the bird was seen by a number of observers including A. W. Boyd and W. Ramsden, both of whom have seen the species previously and confirmed its identification.

P. FOSTER.

STUDIES OF SOME SPECIES RARELY PHOTOGRAPHED.

XX. THE PECTORAL SANDPIPER.

Photographed by PHILIP WAYRE AND R. P. BAGNALL-OAKELEY.

THE GREATER YELLOWSHANK.

Photographed by ALLAN D. CRUICKSHANK, WALTER E. HASTINGS
AND NOBLE ROLLIN.

THE YELLOWSHANK.

Photographed by ALLAN D. CRUICKSHANK AND NOBLE ROLLIN.

THE RED-BREASTED SNIPE.

Photographed by ALLAN D. CRUICKSHANK.

(Plates 23-32).

THE autumn of 1948 was marked, as recorded on p. 135, by a surprisingly widespread visitation of American Pectoral Sandpipers (*Calidris melanotos*) in the British Isles and we reproduce here the remarkably successful photographs taken by Messrs. Philip Wayre and R. P. Bagnall-Oakeley of one of these birds at Salthouse, Norfolk. It can be safely claimed that this is the only example of a Pectoral Sandpiper that has been photographed in Europe and the achievement seemed to us so interesting that we asked the photographers for a short account of the method adopted to secure the pictures. This will be found on p. 145. The photographs show very well the characteristics of the species, especially the sharp demarcation between the strongly streaked breast and the white belly.

We take the opportunity at the same time of publishing photographs of several other American waders which visit this country from time to time. Those of the Greater Yellowshank (*Tringa melanoleuca*) are of special interest in view of the occurrence of an example of this very rare visitor to Europe recorded on p. 155. Attention may be directed particularly to Mr. Allan D. Cruickshank's beautiful photographs on plates 28 and 29, which enable a comparison to be made between the Greater Yellowshank and the smaller species, *Tringa flavipes*. Although possibly not all individuals are quite as distinct as these, since it is said that the largest Yellowshanks do not look very different in size in the field from small Greaters, the typically heavier build and stouter bill of the latter species are very well shown. The photograph of a Greater Yellowshank in plate 26 appeared in A. C. Bent's "Life Histories of North American Shore Birds" (*Bulletin* 146, *U.S. National Museum*) and is reproduced by kind permission of the photographer, Mr. Bent, and the Smithsonian Institution of Washington. We are also able to add some interesting photographs of both species taken by Mr. Noble Rollin on the western side of Hudson Bay in the Churchill area (Manitoba) in 1939. Mr. Rollin has also kindly provided a photograph taken in the same region, of typical Yellowshank breeding terrain, consisting of tundra with scattered shallow pools on the borders of the northern forest.



AMERICAN PECTORAL SANDPIPER (*Calidris melanotos*), SALTHOUSE, NORFOLK, SEPTEMBER, 1948.
(Photographed by P. Wayre and R. P. Bagnall-Oakeley).



AMERICAN PECTORAL SANDPIPER (*Calidris melanotos*), SALTHOUSE, NORFOLK, SEPTEMBER, 1948.
(Photographed by P. Wayre and R. P. Bagnall-Oakeley).



AMERICAN PECTORAL SANDPIPER (*Calidris melanotos*), SALTHOUSE, NORFOLK, SEPTEMBER, 1948.
(Photographed by P. Wayre and R. P. Bagnall-Oakeley).



GREATER YELLOWSHANK (*Tringa melanoleuca*), LYON, MICHIGAN, APRIL 25th, 1924.
(Photographed by Walter E. Hastings).



GREATER YELLOWSHANK (*Tringa melanoleuca*): JUVENILE FEEDING.
CHURCHILL AREA, HUDSON BAY, 1939.
(Photographed by Noble Rollin).



GREATER YELLOWSHANK (*Tringa melanoleuca*).
(Photographed by Allan D. Cruickshank).



YELLOWSHANK (*Tringa flavipes*).
(Photographed by Allan D. Cruickshank).

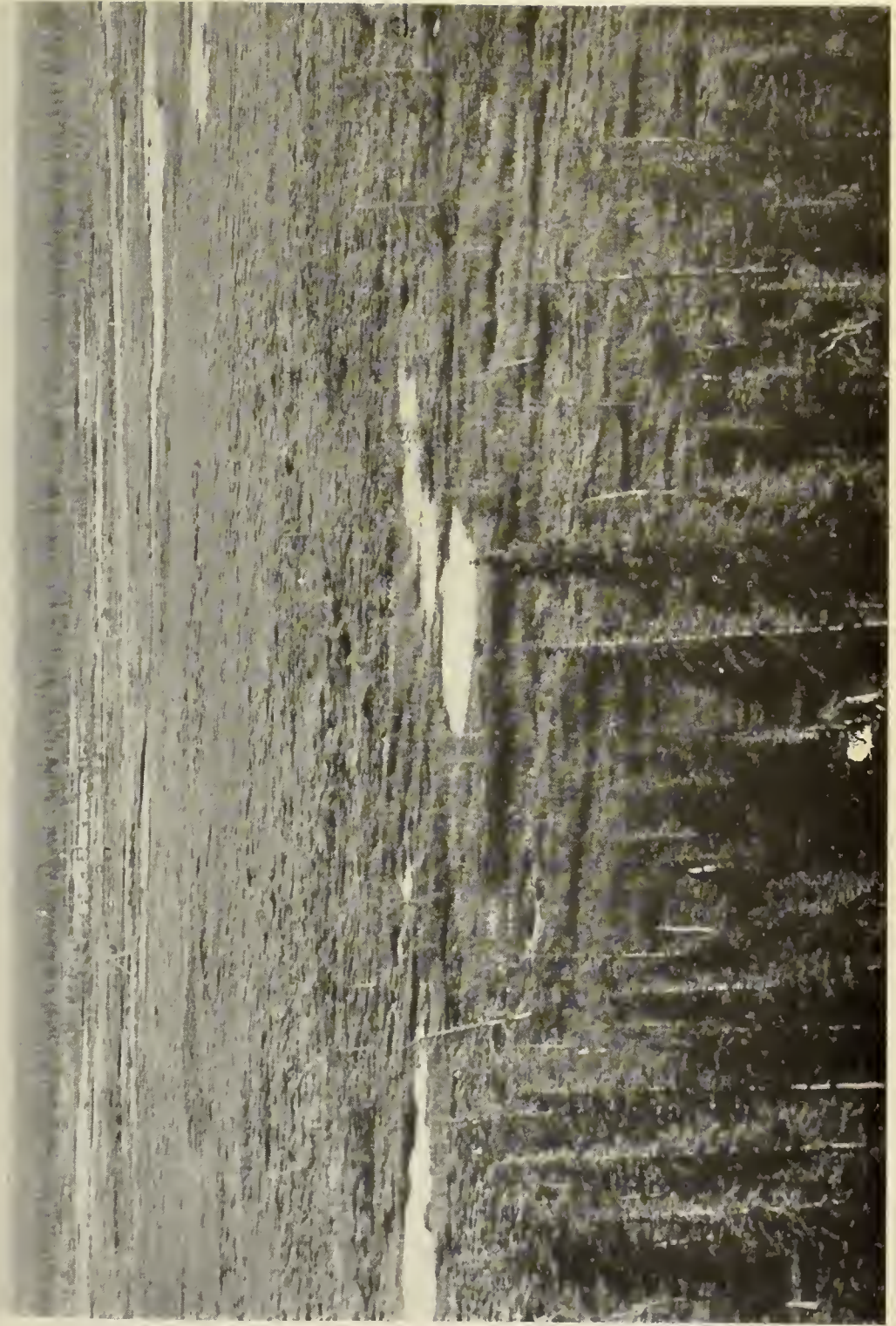


YELLOWSHANK (*Tringa flavipes*), CHURCHILL AREA, HUDSON BAY, 1939.

Upper.—BIRD BALANCING ON TOP OF LARCH AFTER ALIGHTING.

Lower.—THE SAME BIRD SETTLED IN POSITION.

(Photographed by Noble Rollin).



BREEDING GROUND OF YELLOWSHANK, CHURCHILL AREA, HUDSON BAY; TUNDRA WITH SHALLOW POOLS ON
P ERS OF FOREST.



RED-BREADED SNIPE OR DOWITCHER (*Limnodromus griseus*).
(Photographed by Allan D. Cruickshank).

The Red-breasted Snipe or Dowitcher (*Limnodromus griseus*), figured in plate 32, has been recorded over 20 times in the British Isles. The combination of long, straight snipe-like bill and white rump are distinctive.

We particularly welcome the opportunity of publishing these photographs, since apart from their intrinsic interest and excellence, they should be of considerable assistance, for identification purposes, to observers encountering any of the species figured in this country.

B.W.T.

PHOTOGRAPHING THE AMERICAN PECTORAL SANDPIPER AT SALTHOUSE.

BY

R. P. BAGNALL-OAKELEY.

THE particular bird was the first of three to visit this district in September and October of 1948. It was seen regularly for several days prior to September 15th and 16th, on which dates the photographs were taken. It was noticed that the bird invariably frequented a small area of marshy ground which was dotted with numerous shallow pools and interspersed with a copious growth of coarse grass and sea aster. The bird regularly fed in two of these pools and rested in the lee of a large reed clump, from which position it could always be flushed if it was not observed in the open.

Several watchers approached to within 12 yards or so of the bird when resting and nearly as close when feeding. When flushed it often flew round for a short time and sometimes went out of range of binoculars, but it always returned to the same spot within a few minutes. Mr. Wayre and I therefore decided to try to photograph the bird while it retained its marked preference for this small area. Our plan was to flush it from its resting place and set up the camera without hide or camouflage of any kind while it was flying around. On the first occasion, however, it flew only about 20 yards, so the camera was set up on a spit of solid land between its two favourite pools.

The photographer remained motionless, following the bird in the ground-glass screen of his reflex view-finder while the "beater" walked the bird slowly towards the camera. In photographing waders in this way—not a difficult process given plenty of time—several rules must be rigidly observed once the bird has been manoeuvred into a position between the photographer and the "beater," who must *never* be less than 30 yards or so apart.

(a) the bird must never be forced towards the photographer by the direct approach of the "beater." Both are objects of suspicion and no bird, however tame, will tolerate being sandwiched between them.

(b) The photographer, if operating without a hide, must remain motionless looking into the view-finder and allow the beater to walk the bird into a suitable position. A small degree of

movement of the camera and tripod head for focussing is, of course, inevitable.

- (c) The beater must never move when the bird is motionless or he will probably make it fly. Move when the bird moves; in the opposite direction from that in which it (the bird) is required to go.
- (d) Quick, even violent, movement from a distance is far safer and more effective than slower movement at close range when the bird is suspicious.

These simple rules worked perfectly in this case; in fact, the bird spent a considerable time inside the minimum focal distance of the telephoto lens ($4\frac{1}{2}$ yards).

It was difficult to photograph, as it was very restless—alternately feeding, preening, bobbing in true sandpiper fashion and when apprehensive rubbing its breast with its bill, an action which it must have repeated hundreds of times during the course of the five or six hours spent in photographing it. On no less than four occasions the bird flew off, probably owing to too close an approach of the beater to the cameraman, but in each case it returned to within a few yards of where it had left, the beater having withdrawn some distance in the meantime.

Unfortunately this very accomodating bird preferred to feed in spots which were very overgrown by sea aster and grass and seldom remained in an open space long enough to focus and make an exposure.

It is of course desirable with most waders to use a hide in conjunction with this method of "driving" and photographing the birds, but in cases where they have previously shown themselves to be tolerant of relatively close approach this method will almost always work without one if carried out slowly. Few birds, when driven away from a particular spot, are so accomodating as this Pectoral Sandpiper, which returned to be photographed four times. Sixteen photographs were obtained.

VITAL STATISTICS FROM RINGED SWALLOWS.*

BY

DAVID LACK (Edward Grey Institute, Oxford).

AGE AT DEATH.

THE age of the Swallow (*Hirundo rustica*) has been determined from ringing recoveries by the method utilised for other small passerine birds (Lack, 1943, modified 1946). Deaths are grouped in whole years, not for each month separately, as there may be seasonal bias in the chances of a ringed bird being reported. In the Swallow, for instance, many more are reported in summer in Britain than in winter in Africa. In calculating average age, it is assumed that each individual lived for half the year in which it died. The year has been taken from January 1st to December 31st, because in various small passerine birds the mortality-rate in the first six months of life is higher than subsequently (Lack, 1946). In the Swallow, there are not enough data to investigate mortality during the first six months of life, but the recoveries for this period are listed in a footnote to Table 1.

In previous studies, the annual mortality was assessed as the percentage of ringed birds found dead within the first year after ringing. In the present paper, a somewhat better figure, the average annual mortality, has been given, which utilises data for all years. The formula for it is given as a footnote to Table 1. Calculated in this way, the average annual mortality of the Swallow is 63%, and the expectation of further life on the first January 1st of life is 1.1 years. These figures are extremely close to those obtained for the Robin (*Erithacus rubecula*) by Lack (1943, 1948) and for the Redstart (*Phoenicurus phoenicurus*) by Ruiter (1941) (discussed by Lack, 1946). They are the lowest figures for average adult survival known for any species of bird.

TABLE 1. AGE AT DEATH OF SWALLOWS RINGED AS NESTLINGS.

<i>Year of death</i> (Jan. 1—Dec. 31)	<i>Number found</i>
1st	67
2nd	19
3rd	7
4th	2
5th	3
9th	1

Average annual mortality—63%.

Expectations of further life on Jan. 1st—1.1 years.

$$D_1 + D_2 + D_3 \dots\dots$$

NOTES. (i) Average annual mortality—

$$D_1 + 2D_2 + 3D_3 \dots\dots$$

where D_1 , D_2 , D_3 —number found dead in each year.

- (ii) 44 were found dead within one month of ringing, 37 in the next two months, and 2 more before the first Jan. 1st of life.

* Publication of the British Trust for Ornithology.

SEASONAL DIFFERENCES IN BROOD-SIZE.

The brood-size of the Swallow has been studied by Boyd (1935, 1936). It occurred to me that a large series of data on this point were hidden away in the schedules of ringed birds, since every ringer records, or should record, the number of young in the brood. Miss E. T. Silva, Miss K. Price and the writer therefore worked through all the ringing schedules of the Swallow from 1929 to 1939, to determine the number of broods of each size ringed. Other studies in progress at the Edward Grey Institute show that in most small passerine birds (omitting titmice), nest losses do not vary with clutch-size and brood-size, i.e., the percentage of eggs which produce fledged young is similar for each clutch-size. This means that variations in brood size reflect variations in clutch-size.

The data in Table 2 show that the average brood-size of the Swallow is highest for the first broods in June (4.16), and thereafter declines steadily until September (3.50). Presumably there is a parallel decline in average clutch-size. A similar decline in average clutch-size between June and the autumn is found in many other European passerine birds (Lack, 1947).

TABLE 2. SEASONAL VARIATIONS IN BROOD-SIZE.

Brood-size.	Number of broods ringed in			
	June	July	August	September.
2	135	144	115	29
3	225	317	269	92
4	447	540	532	109
5	593	508	284	24
6	67	14	5	—
7	1	—	—	—
Total	1468	1523	1205	254
Average	4.16	3.95	3.83	3.50

NOTE. Ringing does not distinguish broods of 1 young from single young ringed casually, hence broods of 1 have to be omitted from Table 2. Broods of 1 are rare, but they occur—about 2% of the total, according to Boyd (1936). Their inclusion would slightly reduce the above averages.

Egg-collectors claim that, in various passerine species, average clutch-size is higher in some years than others. It is extremely difficult to find sufficient clutches in successive years to prove this point statistically. However, the brood-size data from the ringing schedules are sufficiently extensive to be analysed for each year separately. As shown in Table 3, the average size of June (first) broods of the Swallow in different years varied between 3.91 and 4.38 young. An analysis of variance shows that the differences in question are statistically significant (the odds against such differences occurring purely by chance are about 100:1). Likewise in July the average brood-size in different years varied between 3.81 and 4.14, and in August between 3.77 and 3.98, but these differences were not statistically significant (i.e. though perhaps

genuine, they might be attributable to chance). The date for July and August have been deposited at the Edward Grey Institute, while the June figures are set out in Table 3. The factors which cause such annual variations in brood-size, and perhaps in clutch-size, are not known.

TABLE 3. ANNUAL DIFFERENCES IN BROOD-SIZE (JUNE).

Year	Number of broods.	Average brood-size
1929	46	4.26
1930	102	4.38
1931	154	4.23
1932	125	4.23
1933	215	3.98
1934	161	4.11
1935	148	4.20
1936	113	3.91
1937	127	4.25
1938	81	4.22
1939	196	4.20
Total	1468	4.16

NOTE. The standard error per brood is 1.04. This gives a difference between years which is significant (nearly 1%).

SURVIVAL IN RELATION TO BROOD-SIZE.

It has been shown for the Starling (*Sturnus vulgaris*) that the young from broods of above the average in size survive less well than the young from broods of average size or smaller, due to a higher mortality in the first few weeks after leaving the nest (Lack, 1948). This point is tested for the Swallow in Table 4. There are far too few recoveries for the data to be significant either way, and no conclusions can be drawn from this table. It is published merely because similar studies are being carried out on other species.

TABLE 4. SURVIVAL IN RELATION TO BROOD-SIZE.

Brood-size.	No. of ringed.		Recovered more than 3 months out of nest.
	broods	young	Total
2	423	846	1
3	903	2709	16
4	1628	6512	15
5	1409	7045	25
6	86	516	1
7	1	7	—

SUMMARY.

1. The average annual mortality of the Swallow is 63%, and the expectation of life on the first January 1st of life is another 1.1 years.
2. Average brood-size declines from 4.06 in June to 3.50 in September.
3. There are significant differences in the average size of June (first) broods in different years.
4. The figures for survival in relation to brood-size are too few to be conclusive.

ACKNOWLEDGEMENTS.

I am greatly indebted to Miss E. Silva and Miss K. Price for their help in the laborious counting of ringing schedules from brood ringed in each year, and to Dr. D. J. Finney and Mr. R. M. Sampford for their help on statistical points.

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NOTES.

FLOCKING OF RAVENS.

READING Mr. Coombes' article on this subject (*antea*, Vol. xli, pp. 290-4) reminded me of a similar experience in Iceland which may be worth recording in relation to his observations. On June 1st, 1912, we, the late J. P. Chaworth Musters and I, had put into Flateyri on the N.W. peninsula to coal our ship at the cod drying station there. To avoid this dirty operation we strolled up Onundarfjord and were at once struck by the abundance of Ravens (*Corvus corax*). They seemed to be everywhere and chiefly in pairs. I counted 26 birds together in one flock alone. There was a large quantity of bleached whale bones lying about, but they did not seem to be the attraction nor could we see that the birds were feeding on anything. But it was clear that they were non-breeding birds for at this date occupied nests had young birds. J. J. BALDWIN YOUNG.

UNUSUAL DISPLAY OF GREENFINCH.

ON MAY 30th, 1948, in my garden near Whitby, Yorks, I watched an unusual display of the Greenfinch (*Chloris chloris*). The cock and hen were on a branch of a hawthorn bush and, when first observed, the cock was trying (unsuccessfully) to copulate. He then hopped off the female on to the branch and threw his head up. The beak pointed vertically upward, making a marked (right) angle with the body, which was almost horizontal. He sang. The throat was slightly distended and throbbed. The song was different from the normal type and contained a repeated sweet, clear note. The female then appeared to attack the male, pecking at his beak and head without actually touching him. The male continued to sing in this curious posture for a few moments. They then noticed me and the cock flew to the ground while the hen flew off.

A very similar Greenfinch display was noticed in the same area a few days later.

ARNOLD B. WALKER.

"INJURY-FEIGNING" OF MEADOW-PIPIT.

ON MAY 8th, 1948, at Caerall, Glamorgan, after being disturbed from its nest with four eggs, a Meadow-Pipit (*Anthus pratensis*) fluttered along the ground and stopped after going about two yards. When I made no attempt to follow it, the bird flew away.

On the evening of the same day, a similar occurrence took place at another nest of the same species. DAVID J. LLEWELLYN.

AUTUMN DISPLAY OF WHITE WAGTAIL.

ALTHOUGH pursuing of female by two or more males is described as occurring in the early stages of courtship of the Pied Wagtail (*Motacilla alba yarrellii*) in *The Handbook*, there is no description of the "sexual chase" given as a characteristic form of display—as, for example, in the Reed-Bunting (*Emberiza schœniclus*)—either in the Pied or White Wagtail (*Motacilla a. alba*).

Frequent observations of a form of display by White Wagtails have been noted during September and October in Germany. This has led to the suggestion that this may be a characteristic form of autumn display in this species. No note has been made of similar activity in spring. The chase takes place between two adults, although unfortunately accurate details of sex are not always easy to determine at this time of year. It may last only for a few seconds, as, for instance, from one side of a pool to the other, but complicated aerial evolutions have been observed, the birds twisting and turning at speed and for some distance. On one occasion a pair rose in the air facing one another, bills seeming to touch, suggesting a form of "kiss" display. Juveniles have not been noted taking part in this display, but accuracy of determination of age, as well as sex, has not always been possible.

P. R. WESTALL.

[Mr. R. B. Clark has recently (*antea*, Vol. xli, p. 244) remarked on similar autumnal chases in the Skylark (*Alauda arvensis*) and attention may be directed to this note and the editorial comment on it.—EDS.]

MALE CUCKOO PLAYING WITH DRY GRASS.

ON May 9th, 1948, in the evening, I was watching a male and female Cuckoo (*Cuculus canorus*) near Whitby, Yorkshire. The male had been flying about after the female, who was, apparently, looking for a nest. The female disappeared among some rushes and the male flew to a fence and sat on the top rail for a few moments with tail raised and wings dropped. He then flew to the ground and picked up a loose tuft of grass, dry and whitish with some roots attached and rather larger than a golf ball. He flew back to the fence-top with it in his bill and sat there, holding it, for perhaps 15 seconds. The female reappeared and he dropped the grass and flew off after her.

ARNOLD B. WALKER.

[It would appear that when sexually excited both sexes may toy with what in other birds might be called nesting material; E. P. Chance (*The Cuckoo's Secret*, p. 114) records the female carrying a twig or straw when chased by the male.—EDS.]

SINGULAR BEHAVIOUR OF LITTLE OWL.

ON July 17th, 1948, I was surprised to see a young Little Owl (*Athene noctua*) which, on being flushed, flew to a large elm and alighting on a very slender branch suspended itself therefrom upside down by one leg for fully a minute before seeking a more normal position.

JOHN C. S. ELLIS.

[We cannot believe that the behaviour described was "natural." It seems possible that the bird, being a young one, failed to secure a proper footing and overbalanced, or it may have been diseased or suffering from some congenital disability.—EDS.]

MOORHEN AS PREY OF TAWNY OWL.

THE nesting-hole of a Tawny Owl (*Strix aluco*) which I had seen at Stewkley, Buckinghamshire, when it held young late in April, was examined on August 13th, 1946, and contained the legs and feet (but no other recognizable remains) of a Moorhen (*Gallinula chloropus*). From their state of preservation and their position among the topmost debris it was obvious that these legs could not have been in the hole in the early stages of nesting. It may be of interest to add this instance of the Tawny Owl preying on Moorhens to those already quoted (*antea*, Vol. xli, p. 311) since the present record shows that Moorhens are taken not only in hard weather.

R. F. DICKENS.

GOOSANDER NESTING IN KIRKCUDBRIGHTSHIRE.

As *The Handbook* records that the Goosander (*Mergus merganser*) nests in Dumfriesshire, but does not mention Kirkcudbrightshire, it seems worth placing on record that one has nested for three successive years in a hole in an alder tree by a stream in the New Galloway district of the latter county. This year (1948) another one nested in a hollow trunk by the same stream, but it was near some cottages and the side of the trunk was broken away and the eggs taken just before hatching time. I myself only saw this one once, on April 12th, and she kept up a kind of roaring purr, which made the tree reverberate.

People in the district who see a good deal of the birds seem to take Goosanders' nests for granted.

On May 20th, 1948, about noon, we had the great pleasure of seeing the ducklings leave the nest. The mother came out and walked swiftly down the bank and over the boulders. In mid-stream she paused and called with beak pointing to the sky. The next thing we saw was a duckling in mid-air. One after another without pause they leapt and fluttered over three feet to the ground until there was a group of eleven grey and white ducklings on the grass. Then they all made for the water. The white patch under the eye was very conspicuous.

We saw the eggs on May 17th. On the 18th we saw the Goosander on the nest, but no sign of the ducklings, which I saw for the first time at 5 p.m. on the 19th.

J. McCLURE.

[Down from one of the nests, kindly submitted to us by Miss McClure, confirms the identification.—EDS.]

BREEDING OF FULMAR PETREL IN ANGLESEY.

ON MAY 2nd, 1948, in company with W. T. Griffiths, I watched between six and eight Fulmars (*Fulmarus glacialis*) flying along the cliff face at Penmon, Anglesey. Two Fulmars were resting on an earth-covered rock ledge about 50 feet up the cliff. They were courting and one of them was sitting in a shallow scrape in the earth. We disturbed these birds and found that the scrape was empty.

We visited the same place on May 30th and found a Fulmar sitting in the same shallow scrape as before. When we tried to disturb the bird it raised its body and revealed an egg, which it moved before settling down again. Further attempts to move the bird met with no success. A second bird seen sitting on a grassy ledge may have been brooding, but we could obtain no proof.

E. V. BREESE JONES.

[The first recorded breeding of the Fulmar in North Wales took place in 1945 at Great Orme's Head, Caernarvonshire, which is some ten miles east of Penmon across Beaumaris Bay. In Anglesey Fulmars have been recorded during the breeding-season at South Stack, Holyhead, but breeding has not been proved—*vide antea* Vol. xxxix, pp.28-29.—EDS.]

IN view of Mr. Breese Jones's interesting note it seems worth while placing on record other developments in North Wales since the note quoted above by the Editors was published.

No more news has been received of Fulmars at the South Stack, where they may of course also be breeding by now. At St. Mary's Well, at the tip of the Llyn Peninsula, one Fulmar was seen flying up and down the cliff, but not landing, on May 21st, 1945, by G. A. Deane and Miss S. L. Sack. This is the first sign of possible "interest" in Llyn. Birds continue at Great Orme and at Little Orme were proved to breed for the first time in 1948 by H. P. Evans, who found two pairs to have laid. One of the eggs disappeared at the end of the first week of June, Lesser Black-backed Gulls being suspected; the other hatched off on July 25th.

JAMES FISHER.

TURTLE-DOVE DISPLAY.

ON the afternoon of June 12th, 1948, I was watching a Turtle-Dove (*Streptopelia turtur*) settled in the top of a tree some 50 yards away. Undisturbed, it suddenly took off, ceasing its song, and flew on an upward slope with widely spread tail and rapid wing-beats, each beat producing a loud clapping. There were approximately 15-20 claps before the bird went into a downward glide, landing unhurriedly in another tree about 50 yards from the take off. I saw no other bird of the species to whom this display could have been given. *The Handbook* states that wing-clapping as an accompaniment to such a performance needs confirmation.

J. F. MONK.

CURLEW BREEDING IN SUFFOLK.

ON JULY 12th, 1948, whilst bird-watching with Mr. B. A. Leach on a large tract of heathland near Brandon, I saw a Common Curlew (*Numenius arquata*) which, judging by its agitated behaviour, might be breeding near by. This was proved to be so, for on searching near where the bird was seen a fully fledged juvenile Curlew was caught, the bird being still too young to fly.

A quarter of a mile away on the same heath four Curlew were watched feeding whilst one stood on guard on a pile of bombs, and two or three other birds were seen flying around. The head gamekeeper informed me that he had seen them here for the last two summers and had suspected them of breeding.

On July 21st, 1948, about $2\frac{1}{4}$ miles from where the young bird was caught on the 12th, two juvenile Curlew were watched at a range of about twenty yards with a telescope x 25, and down could be seen adhering to the neck. This took place on a large area of very rough ground, upon which small Scots Pines had been planted, and Curlew had been seen here for a fortnight.

Common Curlew have been seen here for the last five summers by a gamekeeper who suspected them of breeding.

Photographs of the first juvenile Common Curlew were taken. There is no record of the Common Curlew breeding in Suffolk in *The Handbook of British Birds* or in Ticehurst's *Birds of Suffolk*, so this is taken as being the first record for the breeding of this species in Suffolk.

T. R. EVANS.

GREATER YELLOWSHANK IN NORTHAMPTONSHIRE.

ON August 22nd, 1948, we observed a Greater Yellowshank (*Tringa melanoleuca*) on the Northampton Sewage Farm. The bird was watched for a considerable time under excellent conditions of light with field-glasses and a telescope at ranges from about 40 to as little as 25 yards (subsequently measured). Greenshanks (*T. nebularia*) and two Spotted Redshanks (*T. erythropus*) were present on the same pool and at one period for certainly over a minute the Greater Yellowshank, a Greenshank and a Spotted Redshank were all feeding within a few yards of one another, so that all three were in the field of the glasses at once. The opportunities for comparison with related species were thus ideal, and indeed the conditions of observation in every respect could hardly have been bettered.

The size was approximately the same as Greenshank, but it was a noticeably stouter, more robust-looking bird. This was especially noticeable in flight, when it looked much stockier, without the slender, rather attenuated form of a Greenshank. The bill was quite straight and of similar stoutness to a Greenshank's, a trifle shorter than that of the Greenshank observed near it, and conspicuously stouter than a Spotted Redshank's. The general effect of the plumage was grey-brown, not so grey as a Greenshank. The crown was quite strongly streaked with blackish and whitish or grey. There was a definite, but not very prominent, light eye-stripe. The back and sides of the neck were streaked. The upper-parts in general, i.e., mainly the wing-coverts, showed a fairly strongly chequered pattern somewhat like a Wood-Sandpiper, the mantle being more streaked and the streaks fairly prominent. The under-parts were white, but the whole breast very strongly and boldly streaked with blackish and the flanks had a few prominent blackish bars. This

strong marking of the breast contributed to making the bird at a little distance look much darker, less grey and white, than a Greenshank. Some blackish feathers on the upper-parts were evidently a part of the summer plumage and the fact that the long secondaries were not prominently barred as in a juvenile seems to leave no reasonable doubt that the bird was adult. The flight pattern was distinctive, the white base to the tail not being continued up the back between the wings as in a Greenshank, while the upper tail-coverts and base of the tail appeared dull white, shading off into a buffish effect towards the end of the tail, produced by the brownish barrings and markings. The legs were not of the striking orange-yellow usually described and figured ; at close range they could be seen to be of a kind of yellowish flesh colour, the yellowish quite definite but not at all bright.

The bird called quite freely with an extremely Greenshank-like note repeated ordinarily three times (once four) in the manner stressed by American observers as characteristic, in contrast to that of the Yellowshank (*Tringa flavipes*), which is rarely more than double. This call was so Greenshank-like that it is doubtful whether it would have been differentiated if heard without the birds being seen. Even Greenshanks appeared to be deceived, as one answered it when it called and joined it in the air when it flew. It fed by picking food from the surface of mud and water and its whole behaviour was very like a Greenshank's. When preening it was observed to dip its bill in the water, like various other species of *Tringa*.

There is reason to believe that it arrived on the previous day, August 21st, and was probably seen arriving by Mr. R. E. Burton. It is also substantially certain that it had left by the 23rd, when B.W.T. revisited the farm in company with Mr. W. B. Alexander, and it was not seen again.

Unlike such species as the Pectoral Sandpiper, the Greater Yellowshank breeds only in North America and not in Siberia, so that it must be assumed that the bird had crossed the Atlantic. The Meteorological Office of the Air Ministry was therefore consulted in order to find out whether anything in the meteorological conditions prevailing on the American side during the few days preceding August 21st would appear to have been especially favourable to such a crossing. We were informed in reply that : "There were no strong westerly winds along the Atlantic coast of North America on the 16th, 17th and 18th. On the 19th there was a depression east of Nova Scotia which deepened and moved eastward slowly. On the 21st there was a south-westerly wind, strong to gale between the Azores and longitude 10°W." The writer considered it conceivable that a passive air-borne object (if a bird were regarded as such) "might have been carried from near Newfoundland on the 19th to England on the 22nd," but added that "as you say this arrival was a very exceptional occurrence one would expect to find

exceptional wind conditions in the North Atlantic to account for it, and I do not think one could say that the wind conditions from the 16th to 21st were exceptional." It appears, therefore, that the occurrence cannot be related to any very obviously favourable wind conditions over the Atlantic, though it will be realized that it cannot be considered in any way certain that the bird had not reached the British Isles some time before it visited Northampton, which it may have been led to do by falling in with other waders on the coast.

F. K. BOSTON, E. H. LOUSLEY AND B. W. TUCKER.

[Although there are only four accepted records of the Greater Yellowshank for England (to which another is added below) and two for Ireland, I have no hesitation in claiming the above as a fully authenticated record of this very rare visitor. The full details obtained of plumage, size, bill, appearance in flight and notes are quite conclusive, in spite of the fact that the legs were not of the bright yellow which appears to be usual. This last fact appears to call for comment in view of the curious circumstance that two or three examples of apparently carefully identified American waders in England, which have come to my notice in recent years, appear to have had unusually coloured legs. A wader which was almost certainly a Pectoral Sandpiper (*Calidris melanotos*) seen in Oxfordshire on August 19th, 1943, by Mr. W. B. Alexander, well-known as a most experienced and accurate observer, was recorded in square brackets in the *Report of the Oxford Ornithological Society* on account of its having had blackish legs; and another record from Shetland which appeared to agree perfectly with a Pectoral Sandpiper in every other way was rejected after consultation with Dr. Ludlow Griscom, the well-known American ornithologist and authority on field identification, because the description of the leg colour appeared to be outside the normal range of variation in that species. One or two other very *probable*, but slightly more problematical cases need not be particularized. The whole thing may of course be mere coincidence and it may seem far-fetched to suggest any connexion between aberrant leg colouring and the fact that the birds were out of their normal range. Food is known to influence the colours of the soft parts of birds. It certainly seems improbable that a bird of no more specialized feeding habits than a wader would find such a deficiency of some type of food in Europe, as compared with America, as to affect its pigmentation, and to suggest any physiological correlation between pigmentary deficiency and abnormal migratory behaviour seems too fanciful altogether; yet the facts are so curious that I feel justified in drawing attention to them. In the present case it is of course conceivable that the bright orange-yellow leg colour is characteristic of the breeding-season and becomes dulled in winter, but I can find no evidence in American literature of a seasonal change and apparently birds on normal autumn passage in the United States have the legs bright yellow.

In view of the 1948 occurrence I have asked Mr. T. C. Gregory to supply fuller details about a Greater Yellowshank seen by him in Kent in 1943, which though evidently correctly identified by this experienced observer was recorded with obviously inadequate particulars in the *South-Eastern Bird Report* for that year. This Mr. Gregory has kindly done and the amplified record will be found below.—B.W.T.]

GREATER YELLOWSHANK IN KENT IN 1943.

IN the *South-Eastern Bird Report* for 1943 a Greater Yellowshank (*Tringa melanoleuca*) is recorded on my authority as having been observed in North Kent from September 7th to October 1st, 1943.

As the particulars there given are somewhat meagre the following may be added in fuller authentication of the record. When walking on the tide-line the bird looked much taller than the Redshank with which it was feeding. Its bill was stout and somewhat upcurved, obviously longer than that of the accompanying Redshank. The flight was swift with the neck outstretched, the wings appearing noticeably dark in comparison with the body plumage and without any white. When feeding it dashed through the water as Greenshanks will do, presumably in pursuit of fish. It was restless in its behaviour and kept joining small parties of Redshanks feeding on the tide-line, but usually dropped into deeper water. Occasionally it hovered above them with the yellow legs downstretched. Other characters, such as the white-flecked upper-parts and white rump, agreed perfectly with this species.

The bird was excessively noisy. It had various notes, but "whee-whee-whee" was the predominant one. The call note was apparently "choo-eee" (or "tu-whee"), as it responded to my imitation of that call.

T. C. GREGORY.

SPOTTED REDSHANK IN CO. DUBLIN.

ON APRIL 7th, 1948, a Spotted Redshank (*Tringa erythropus*) in transitional plumage was seen in a flock of Redshank (*T. totanus*) on an estuary near Rush, Co. Dublin. A short view was obtained at about 20 yards distance through binoculars, and the lighter colouring, more spotted appearance, deeper red legs, taller and comparatively more slender build than the Redshank's were noticeable. Unfortunately it rose with a crowd of waders and I was unable to pick it up in flight.

The bird has not been recorded many times in Co. Dublin and the date is also early.

R. G. PETTITT.

UNRECORDED NOTE OF LAPWING.

DURING July and August, 1939, I spent many hours in a hide I had beside a pool at the Midrips, Sussex. On one occasion a large flock of Lapwings (*Vanellus vanellus*) landed near the hide and started feeding. Whilst landing, and for a few minutes after landing, they kept up a low whining chorus with occasional cheeping. *The Handbook* does not record these notes.

E. M. CAWKELL.

BILL COLOUR OF ROSEATE TERN.

MR. B. W. TUCKER'S note on the bill colour of the Arctic Tern (*Sterna macrura*) (*antea*, Vol. xli, pp. 188-189) prompts me to raise the question of the breeding-season colouration of the bill of the Roseate Tern (*Sterna dougallii*).

My observation of this species, though extending over the past five years, is limited to one Scottish breeding colony and I therefore hesitate to be dogmatic, but it would certainly appear that the red at the base of the bill is not assumed until much later in the season than is generally stated. In *The Handbook* the end of May is given as the commencing date for this change; my observations put it five or six weeks later than that. I have never noted any but black-billed birds throughout June. It is during the first ten days of July that the change sets in and by the third week of the month it is fully developed in the great majority of adult birds.

G. HUGHES ONSLOW.

AGILE FLIGHT MANŒUVRE OF HERRING-GULL.

THE sight of a Herring-Gull (*Larus argentatus*) carrying off the egg of a Guillemot (*Uria aalge*) is common enough where the latter birds are much disturbed, but the occasion of the following note seems less usual.

On May 30th, 1948, I was watching from the cliff-top at Bempton, Yorkshire, when a Herring-Gull came by carrying such an egg. It was beset by another Herring-Gull, which so pestered the first that it released its booty. The second gull immediately stalled and with a rapid manœuvre seized the egg by the pointed end as it fell and flew off with it. The birds were flying to begin with a little below the clifftop—say 500 feet—and the whole manœuvre took place in a vertical distance of somewhere about 50 feet. The successful pirate was beset in turn by the first gull and another, but eluded both and landed with the egg still intact on a grassy slope half-way down the cliff, where it broke, and devoured it.

Mr. Edward Waind, one of the professional Bempton climbers, was with me at the time and recalled having seen a similar incident earlier in the season, though on that occasion the attacking bird had to power-dive to retrieve the egg. Though he is on the cliffs daily through the breeding-season, this behaviour seemed to him rare enough to be noteworthy.

ALFRED HAZELWOOD.

GREAT SKUAS OFF SOUTH COAST IN JULY.

ON JULY 27th, 1948, H.M.S. Devonshire was heading towards the Channel Islands from Torbay. At 0845, when about 25 miles off the South Coast, two Great Skuas (*Stercorarius skua*) passed the ship about 100 yards away on the port side flying south, one about 300 yards behind the other.

This seems to be an unusual time for the occurrence of these birds.

T. M. GULLICK.

[*The Handbook*, though it does not mention occurrences in the Channel before September, records that non-breeding birds are present in summer "throughout N. Atlantic . . . south to 45° off European coast." It is therefore quite possible that occurrences such as the present are really normal, but owing to the scanty information in the literature it seems worth recording.—EDS.]

FLEDGING PERIOD OF COAL-TIT.—Mr. E. Cohen sends the following details of the fledging of a brood of Coal-Tits (*Parus ater*) at Sway, Hants.: at 20.00 hrs., G.M.T., on June 12th, 1948, the nest contained six young and one egg which must have hatched later that evening or the next day; at 16.00 hrs., on June 30th, there were still seven young in the nest, but all had gone by 14.00 hrs. on July 1st. This gives a fledging period of 18-19 days as against the 16 recorded in *The Handbook*.

NIGHTINGALE IN SUSSEX IN OCTOBER.—In connexion with the record by Mr. I. J. Ferguson Lees (*antea*, Vol. xli, p. 215), Mr. S. J. Teideman draws our attention to a record by him published in the *South-Eastern Bird Report* for 1943, p. 27, of a Nightingale (*Luscinia megarhyncha*) which was well seen and clearly identified at North Berstead, Bognor Regis, Sussex, on October 19th, 1943.

LESSER SPOTTED WOODPECKER IN CÆRNARVONSHIRE.—In view of the statement in *The Handbook* that the Lesser Spotted Woodpecker (*Dryobates minor*) is known only as a straggler in Cærnarvonshire, Mr. P. F. Yeo has sent us particulars of birds seen and heard near Llandudno in April and December, 1944, and April, 1945; one watched on April 30th, 1944, was evidently excavating a nest-hole. It must be pointed out, however, that in *Brit. Birds*, Vol. xxxvi, p. 36, Mr. Irvine Whittaker recorded that the species now breeds regularly near Llandudno, where it is by no means uncommon. This should have been noted in the Supplementary Additions and Corrections to *The Handbook*.

LETTER.

HOPPING OF GOLDEN PLOVER.

To the Editors of BRITISH BIRDS.

SIRS,—On September 22nd, 1948, I observed on the shore of Constantine Bay, near Padstow, N. Cornwall, a flock of 24 Golden Plover (*Pluvialis apricaria*) which came in during the afternoon and lit upon some low rocks uncovered by the tide.

The birds were very tame and allowed me to get within approximately 20 yards; at first they remained standing, but after about half an hour started to feed among the rock pools and on the seaweed and in the sand. In addition to the usual method of a short run and tilt over to obtain food I noticed that several birds hopped with a high springing movement exactly similar to a Jay or a Magpie, and this was not confined to the same birds, but was done by various members of the flock.

As I see no reference to this movement in *The Handbook*, nor in any other ornithological work which I have, I mention it as being possibly of interest.

H. RAIT KERR.

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SPECIES AND SUBSPECIES: A REVIEW FOR GENERAL ORNITHOLOGISTS.

BY

B. W. TUCKER.

(continued).

SUBSPECIES AND THE ORIGIN OF SPECIES.

It is now practically universally recognized that subspecies are the raw material out of which species evolve. The study of geographical variation within the species is therefore of the greatest interest and importance in the study of evolution. It was formerly widely supposed that subspecific differences were merely environmental, that is to say developed in each generation as a direct effect of physical influences such as humidity, temperature and so on, and not hereditary. It is now recognized that this is not the case. The hereditary character of subspecific differences has been actually demonstrated by experimental breeding in the American Deer-Mouse (*Peromyscus*) and in some other organisms such as the moth *Lymantria*, and much evidence of a less direct kind leaves no doubt that the conclusions reached in these cases are applicable to subspecies in general. Their characters depend, predominantly at any rate, upon hereditary differences which have arisen in the course of evolution and are an expression of the tendency of all living organisms to vary as a result of heritable changes taking place in the germ-cells.* It should be added, however, that although subspecific differences are not directly induced by the environment there is every reason to suppose that they are largely related to the environment in the sense that they are expressions of an adjustment to varying local conditions which have become established by selection. The relation is well illustrated by the widespread tendency to darkening in moist and warm regions; but since it is scarcely credible that the majority of slight differences in shades of colouring which distinguish subspecies from one another have any direct

*As many readers will be aware, the mechanism of heredity and of the transmission of heritable variations or mutations is well understood, as a result of a vast amount of experimental work, but it is not part of the plan of the present paper to give even an elementary presentation of the basic principles of Genetics. A brief exposition of these will be found in a paper by Prof. V. C. Wynne-Edwards on "The Nature of Subspecies," published in the *Scottish Naturalist*, Vol. 60 (1948), pp. 195-208, while readers desiring a fuller treatment in terms intelligible to the layman will find a very excellent one in Dr. E. B. Ford's volume on *Butterflies* (1945) in the New Naturalist series. Prof. Wynne-Edwards's paper is somewhat more genetical in its approach than the present one and although the two overlap in some respects they may be regarded as to a considerable extent complementary.

influence on the survival of the animals, it is probable that they are in general merely the visible expression of physiological differences which are the really essential and adaptive ones, although small colour differences may be utilized and emphasized in certain special cases because they assist concealment.

It can be accepted, then, that subspecific differences have a hereditary, or in biological terminology a genetic, basis of exactly the same kind as the differences between species, and we have noted already that it is from subspecies that species evolve. The differences between the former are obviously in general much smaller than those which separate species, as indeed would be expected if the evolutionary relation between species and subspecies is as stated, but it should be mentioned that *degree* of difference is not a *necessary* criterion in determining whether certain forms are distinct species or not. We shall return to this point at a later stage.

It must not be supposed that all subspecies are in process of evolving into distinct species. For this to happen a certain degree of isolation is necessary, and even if this is achieved it does not follow that the isolated stock will evolve into a new species. It may not even develop subspecific differences. The Lesser Redpolls (*Carduelis flammea cabaret*) of the British Isles are subspecifically indistinguishable from those of the Alps (and distinct from the northern race or Mealy Redpoll, *C. f. flammea*), although the environmental conditions in the two regions are obviously different and the two populations must have been isolated from one another for many thousands of years. On the other hand a population effectively isolated from its parent stock *may* undergo differentiation until it achieves the status of a distinct species. What exactly this implies must now be examined.

We have so far spoken of a species without offering any precise definition of the term, and indeed the provision of a hard and fast definition by which species can always be distinguished from subspecies has defied all the efforts of taxonomists for the excellent reason that in nature no hard and fast line of separation exists. It is, however, clear that what is meant in biological terms when we say that two populations, isolated from one another but having a common origin, have evolved into distinct species, is that they have diverged from one another to a point at which they will no longer interbreed even if a breakdown of the former barrier should afford them opportunities of so doing. This does not necessarily mean that they will be physically incapable of interbreeding—mutual sterility is not a *necessary* criterion of the specific distinctness of two forms—but the practical absence of interbreeding is one of the most striking characteristics in nature of related species occurring in the same region.

Such divergences as we are discussing clearly involve not only structural and physiological characteristics, but behavioural ones as well, and it is no doubt the combination of all these differences,

and probably the behavioural ones especially, which results in the disinclination of allied species to cross under natural conditions even when the two are mutually quite fertile. The degree of divergence between two originally identical populations necessary to produce such a situation is evidently only rendered possible by a considerable measure of isolation. So long as a fair degree of interchange is possible between them interbreeding will keep the characters of the two populations approximately similar.

There are strong grounds for believing that at any rate in birds and mammals the only type of isolation that is effective in the way described is geographical. In theory two populations of the same species in the same area might gradually become adapted to two different habitats (ecological isolation) and so eventually differentiate into distinct species, but it is probable that interchange and interbreeding between two such populations would never be sufficiently curtailed to permit the requisite divergence to take place, and there are other objections to this view which cannot be entered into here. Ecological factors in conjunction with geographical isolation are no doubt frequently important in the initiation of new species ; it is doubtful whether they are ever effective alone. On the other hand when two populations of common origin have undergone some measure of differentiation in isolation and are then allowed to meet again by breakdown of the barrier, it is probable that different habitat preferences developed during the interval of separation may be of paramount importance in preventing the stocks from coalescing and so permitting further divergence.

From what has been said above, it will be evident that one of the most essential characteristics of a species is that it consists of a number of interbreeding or potentially interbreeding populations which do *not* interbreed with, or in biological phraseology are reproductively isolated from, other such groups, that is to say from other species. This is in fact the definition of a species proposed by Ernst Mayr, of the American Museum of Natural History, in his book *Systematics and the Origin of Species* (1942). It is (as it should be) a biological definition and not a rule-of-thumb device for determining whether any given form is a species or a subspecies. In the case of forms whose ranges are not in contact it must still be left to the judgment of the systematist to decide whether they should or should not be regarded as potentially interbreeding, and this entails a careful assessment of their structural and other characters. Moreover it will be realized that the transformation of a subspecies into a species is not a sudden process, but one involving a gradual succession of stages, so that we should expect to find occasional borderline cases where the decision as to whether two forms are best regarded as two species or as subspecies of one can only be made arbitrarily. Such cases actually occur amongst British and European birds and will be referred to later.

It should also now be clear that it is an essential characteristic of subspecies that they replace one another geographically, and it is usually taken as axiomatic that two forms regularly breeding in the same area must be from that very fact reproductively isolated from one another and therefore distinct species. As a general principle this is clearly sound, but it has occasionally been applied by ornithologists in a childish rule-of-thumb manner. The principle does not apply to isolated or occasional cases of the breeding of stray pairs or individuals of one subspecies in the range of a neighbouring one like the sporadic instances of the breeding of White Wagtails in England*, nor does it apply to the cases of what Mayr has called zones of secondary intergradation (see below), in which individuals of both types occur together.

STAGES IN THE DIFFERENTIATION OF SPECIES.

The phenomenon of secondary intergradation mentioned in the last paragraph may be appropriately discussed further at this point because it affords an illustration of the fact mentioned above that the transformation of subspecies into species is a gradual process and that various intermediate stages can be found. We shall select our examples from a group of cases which are additionally interesting on account of certain features in common which have been interpreted as being due to the common influence of conditions prevailing during and after the Ice-Age in Europe.

The first case which we shall consider is that of the Long-tailed Tit (*Agithalos caudatus*). Over a very large area of northern and eastern Europe and northern Asia this species is represented by a very well-marked race with a white head, *Agithalos c. caudatus*, while in the British Isles and in western and southern Europe a number of forms are found with dark bands on the head developed to a greater or lesser extent. All these races are tolerably constant and uniform in their characters, but in the so-called *Agithalos caudatus europæus*, which occupies most of north-east and middle Europe from N.E. and central France to West Prussia and Rumania quite the reverse appears to be the case. Here, according to the researches of Stresemann (1919), we have a mixed and highly variable population with white-headed and dark-headed birds and all intermediate types. There seems no doubt that this is a case where two originally similar stocks have undergone considerable differentiation in colour during a period of isolation from one another, without such other physiological or behavioural changes as would deter them from interbreeding, so that on meeting again as a result of changed conditions they have produced a mixed or hybrid population in which in accordance with well-known genetic principles

* In quoting this example it is assumed that White Wagtails found breeding in England are in fact birds of Continental origin, as no doubt at least some of them are. On the other hand it cannot be excluded that some such birds are really only variants of the British race. This question in relation to the above and other comparable cases will be discussed further at a later stage.

both parental types and all intermediates occur together. As would be expected, white-headed birds are most numerous in the east near the borders of the range of true *caudatus*. Stresemann showed that in Saxony the proportion of white-headed birds is as high as about 42%, while in north-east France it drops to as low as 3.7%. It is suggested with much plausibility that this state of affairs is the result of the conditions of glaciation during the Ice-Age, when a tract of cold and barren steppe country separated the borders of the northern ice-field in Germany from that spreading out from the Alps, so that the temperate climate animals previously existing in Europe may be supposed to have been driven to seek refuge either in the south-west of the Continent or in the Balkans and Asia Minor. With the amelioration of conditions the previously isolated populations, which had undergone well-marked changes of colour in the meantime, expanded northwards again to meet in Central Europe with the results described. It will be noted that a variable hybrid population such as that referred to is of a somewhat different nature from a subspecies or race in the stricter sense and it would be better if trinomial names were not applied to such populations, but unfortunately their nature has generally only been recognized after a subspecific name has been conferred and is still not appreciated by some systematists.

A closely analogous case to the above and one presumably due to similar causes is that of the Carrion and Hooded Crows, usually reckoned by British ornithologists as distinct species, *Corvus corone* and *C. cornix*. The black or Carrion Crows have an extremely peculiar distribution; *Corvus c. corone* is found in south-western and western middle Europe, including Great Britain, while another form, *C. c. orientalis*, extends across Asia from the Kirghiz Steppes to Japan. The vast intervening region, comprising the larger part of Europe (including Ireland and north Scotland) and much of western Asia, is occupied by the grey-backed Hooded Crows (*Corvus cornix*). Where the black and grey-backed forms meet in middle Europe, Scotland, and again in Asia, they hybridize completely in narrow belts of country in which a mixed population is found consisting of individuals indistinguishable from the parental types with all intergradations.

Here it may be supposed that the result of glaciation in Europe and north-western Siberia was to split the common ancestral stock into a south-western and a south-eastern population in Europe and a far eastern one in Asia. The central group gave rise to the Hooded Crows, which gradually pushed north and north-eastwards when the final retreat of the ice began, eventually reaching the northern coasts of Europe and spreading from Scandinavia to north Scotland and Ireland along the land connexion then existing. A similar spread of the Carrion Crow from the south-west brought the two stocks into contact, and, since they had undergone no important differentiation in anything but colour, resulted in free

interbreeding with the formation of the hybrid zone already described, extending from northern Italy round the southern foot of the Alps and on across Germany to the Baltic and across central Scotland. As already mentioned, a similar hybrid zone exists in Asia.

Meise (1928) and other Continental authors have insisted that because of their habitual hybridization where their ranges meet the Carrion and Hooded Crows ought to be regarded as races of one species and undoubtedly a strong case can be made for this view as against the current practice in this country of treating them as species. On the other hand it is possible to regard the case as so completely on the borderline that either treatment is permissible. At any rate the three stocks referred to above cannot be regarded as simply three races of one species, because the Hooded stock has in its turn broken up into several distinct races in the Mediterranean islands and in the east of its range. Furthermore the constancy and narrowness of the hybrid zones seem to show that the differentiation of the two forms has proceeded somewhat farther than in the Long-tailed Tits, so that hybrids are in some way at a slight disadvantage against either of the parental types. No other explanation seems possible to account for the narrowness of the hybrid zone, which would otherwise be expected on genetical grounds to be much wider. In the circumstances the view is quite defensible that the crows are so near the borderline between species and subspecies that considerations of taxonomic convenience can be allowed some weight, and this is the main ground for treating them as specifically distinct.

There are other cases where what are generally regarded as good species meet and hybridize in certain regions. The most famous is that of the two North American woodpeckers, the eastern Yellow-shafted Flicker (*Colaptes auratus*) and the western Red-shafted Flicker (*C. cafer*). These two forms, presumably differentiated when the heavy glaciation of the Rocky Mountains region formed a barrier between east and west, now meet and hybridize to produce a completely mixed population over a belt of country several hundred miles wide. The two forms, quite distinct in colouration (though the general pattern is similar) and each with recognized subspecies, would unhesitatingly be regarded as distinct species if they had not met in the way described, and indeed are still generally so regarded by even progressive systematists notwithstanding that fact. A less known case involving two extremely distinct-looking birds, both on the British List as rare stragglers, is that of the Black-headed and Red-headed Buntings (*Emberiza melanocephala* and *bruniceps*), which in parts of northern Iran meet and hybridize so extensively that birds practically identical with both parental types together with all intermediates can be found in one flock (Paludan, 1940).

A further evolutionary stage is represented by the cases where differentiation in behaviour, habitat and other respects had proceeded far enough to prevent interbreeding when the two stocks met again, even though their external characteristics remained closely similar. This process evidently accounts for the cases, of which there are a number in Europe, of closely related and similar pairs of "good" species whose ranges in part overlap. A good example is afforded by the Nightingale (*Luscinia megarhyncha*) and the so-called Thrush-Nightingale or Sprosser (*L. luscinia*). The latter is the more eastern form, occurring in eastern Europe and west temperate Asia, though its range reaches as near the British Isles as east Denmark and south Sweden. The ranges of the two species overlap in a considerable belt of country extending from Rumania to north Germany, in which, however, they neither compete with one another nor interbreed, although they will hybridize in captivity. The principal factor in maintaining this separation is that the two species have developed different habitat preferences. Both breed in deciduous woods and copses with considerable undergrowth or in thickets and bushy places, but the Sprosser selects almost exclusively damp and even swampy localities which the Nightingale avoids.

An even more interesting case is that of the two European Tree-Creepers, *Certhia familiaris*, the species found in the British Isles, and *Certhia brachydactyla*, the Short-toed Tree-Creeper. These two birds are so alike that for many years after it was described by C. L. Brehm systematists were reluctant to recognize *C. brachydactyla* as a distinct species. Yet the two forms are unquestionably good species distinguished not only by the short hind claw and somewhat longer bill of *brachydactyla*, but by constant small plumage differences, distinct songs and calls and different habitat preferences. *Certhia brachydactyla* is the common creeper of southern and western continental Europe, while *Certhia familiaris* is more northern and eastern in its distribution, with races in Asia and also in America. The ranges of the two species overlap extensively in Central Europe, but whereas *brachydactyla* is the common lowland species, *familiaris* is predominantly a conifer forest—and hence largely a mountain—bird. The history of the two species has presumably been much the same as that postulated for the Long-tailed Tits except that differentiation proceeded farther during the period of isolation, so that the two forms did not interbreed when they met again. It seems reasonable to suppose that *familiaris*, with its extensive distribution in the Northern Hemisphere, is the older form, or perhaps it would be better to say nearer to the ancestral type, adapted primarily to a conifer habitat and perhaps achieving the main outlines of its distribution when the climate was still colder than at present (it is represented by an outlying race in the Pyrenees), while *brachydactyla* is a form of somewhat more recent origin differentiated in the milder climate of south-western Europe.

At any rate in the present case it was the northern and not the western form which colonized Great Britain and Ireland, presumably reaching them from the north like the Hooded Crow, and *familiaris* is the only tree-creeper found in this country, though *brachydactyla* occurs just across the Channel, having presumably spread to this region only after the separation of Great Britain from the mainland, geologically a very recent event.

It is interesting to note, though the point does not primarily concern us here, that in the British Isles, in which conifers are not now native except in north Scotland, *familiaris*, in spite of its predominant association with conifers, has adapted itself to broad-leaved woods and parkland, a habitat typical of *brachydactyla* on the Continent. The case illustrates the fact that if one of two allied species which divide the available habitats between them over much of their range occurs alone in a certain region, it may in that region come to occupy habitats which are characteristic of the other species where both are present.

The case of the two extraordinarily similar tree-creepers illustrates particularly well the point mentioned at an earlier stage that although the differences between subspecies are generally less than those separating species, this is by no means necessarily the case. The two tree-creepers resemble one another much more closely in appearance than do, for example, a number of the races of Yellow Wagtail (*Motacilla flava*) or—to take examples outside Europe—of pheasants or humming-birds. Again it may be noted that even in the case of subspecies which intergrade closely with one another the opposite extremes of a series may be more different in appearance than many good species.

SUBSPECIES CHAINS AND THE CASE OF THE HERRING- AND LESSER BLACK-BACKED GULLS.

The point made in the preceding paragraph, that the extremes of a series of races each of which intergrades with its neighbour may be strikingly different, leads on to the special and instructive case of what have been called subspecies chains or rings. The spread of a species is naturally conditioned by the availability of suitable country. Sometimes the spread may take place in two directions with the gradual evolution of a series or chain of subspecies each grading into the next in the way already described. Occasionally the conditions of spread may be such that the terminal forms of such a linked series eventually meet in a region remote from the centre from which the spread began. When this happens it may be found that they have diverged so far in the interval that they are able to exist together in the same region without any disposition to interbreed and in short behave as good species in spite of the fact that they are linked together by a completely intergrading series of forms. The reader will realize the inevitable arbitrariness and artificiality of nomenclature in such a case. The end members of such a chain

behave unmistakably as distinct species, and yet by virtue of the fact that they are completely linked by a series of intergrading forms they conform completely to the typical characteristics of races of one species and there is no point on the chain at which a break can be made in other than an arbitrary manner. Such cases provide a headache for the tidy-minded taxonomist (fortunately for whom they are not very common), but are of extraordinary interest from an evolutionary standpoint.

A further point of importance brought out by cases of the type just quoted is that whereas the isolation necessary for the development of new species is ordinarily the result of definite physical barriers a similar result may occasionally be achieved by sheer distance even where no important barriers exist.

Ticehurst (1938) has described an almost diagrammatic example of this phenomenon in the case of the Greenish Warbler (*Phylloscopus trochiloides*). The race *P. t. trochiloides* breeds in the Himalayas, northward of which lies a vast area comprising the Tibetan plateau and the Gobi Desert unsuited to the habits of such a species. From the Himalayas it appears to have spread in two directions round this inhospitable region until the races *plumbeitarsus* and *viridanus* have met in a limited area of western Mongolia, in which they behave as distinct species, although both have extensive ranges in which only the one form occurs and in which they conform in every way to the normal characteristics of geographical races.

A more complicated example, but one of perhaps more direct interest and concern to European ornithologists, is that of the Herring and Lesser Black-backed Gulls (*Larus argentatus* and *fuscus*) and their allies. Attention was first focussed on this case by the work of the Russian ornithologist Stegmann (1934) and it has since been discussed by various writers, most recently by Stresemann and Timofeef-Ressovsky (1947).

The Herring and Lesser Black-backed Gulls in Western Europe behave as well-defined and perfectly distinct species, and no one considering the situation in, say, the British Isles alone would think of treating them in any other way. Yet if the gulls of the world are considered they are found to be linked by a whole series of intergrading forms. The case is so interesting and instructive that it will be dealt with here as fully as considerations of space and proportion allow, the various forms being referred to by their subspecific names only.

The facts seem to justify the provisional inference that the original centre of dispersal was in the region of what is now the Bering Sea, probably at a time when North America and East Siberia were connected. In the latter region at the present time is found a somewhat dark-backed Herring-Gull, *vegø*. This intergrades with the race *smithsonianus*, the Herring-Gull of America, which is barely separable from our bird, whose ancestors may be supposed to have reached Europe via America. In a westward direction from East



MAP ILLUSTRATING THE DISTRIBUTION OF THE SUBSPECIES OF THE HERRING GULL AND LESSER BLACK-BACK GROUP.

(Slightly modified from Stresemann and Timofeev-Ressovsky, 1947.)

THE arrows indicate the presumed relations and directions of spread of the races.

[Stresemann and Stegmann use the name *argenteus* for *argentatus* of *The Handbook* and other authors and recognize another race of Herring-Gull, called by them *argentatus*, inhabiting N. Scandinavia, the Baltic, Finland and N. Russia (No. 1 on the map). Witherby, on the other hand, regards the Herring-Gulls of all this area as *omissus* (No. 13 on the map), which would therefore overlap with the Lesser Black-back (*fuscus*) and in a small area with *antelius*, but not with any other form of Herring-Gull. Further investigation seems necessary to clear up this discrepancy.—Eds.]

The other races are as follows: 2. *argentatus* (of *The Handbook*, etc.); 3. *smithsonianus*; 4. *thayeri*; 5. *glaucoides* (Iceland Gull); 6. *vegø*; 7. *birula*; 8. *heuglini* (= *taimyrensis*); 9. *antelius*; 10. *mongolicus*; 11. *cachinnans*; 12. *ponticus*; 13. *omissus* (but see above); 14. *michahellis*; 15. *atlantis*; 16. *grællsii* (British Lesser Black-back); 17. *intermedius* (intermediate between 16 and 18, not recognized as a distinct race in *The Handbook*); 18. *fuscus* (Scandinavian Lesser Black-back); 19. *californicus*.

Siberia along the northern coasts of Asia, there is a succession of several named forms showing on the whole a progressive tendency to darkening of the mantle and culminating in the subspecies *antelius*, a form almost as dark as the British Lesser Black-back which ranges from the Yenisei mouth to the arctic coasts of European Russia. In the transition from *vegæ* to *antelius* there occurs not only a darkening of the mantle, but also a change in leg colour from flesh to yellow; *vegæ* has legs of the former colour, but in the races *birulæ* and *heuglini* (= *taimyrensis*), both pink-legged and yellow-legged individuals occur, while in *antelius* the legs are constantly yellow, so that its resemblance to the British Lesser Black-back (*Larus fuscus grællsii*) is very close in every way.

Most of the races so far referred to are predominantly coastal birds, but reference to the map will show that *heuglini* has penetrated far inland in Asia and in southern West Siberia it grades into the form *cachinnans*, the most easterly representative of the so-called Yellow-legged Herring-Gulls, which extend from Central Asia by way of the Caspian and Black Seas to the Mediterranean, where the local form *michahellis* is slightly darker than *cachinnans*. *Michahellis* in its turn intergrades with the dark-backed *atlantis* of the Azores, Madeira and the Canaries. (Birds of apparently intermediate character which are treated by different authors as either *michahellis* or *atlantis*, but by Stresemann as the latter, breed on the Atlantic coasts of Morocco and Portugal). *Atlantis*, like *antelius* in the north, much resembles the British Lesser Black-back and there is no doubt that the Lesser Black-backs belong to the same stock, though opinions have differed as to whether they are derived from the northern series with *antelius* as their nearest relative or represent the terminal link of the series *cachinnans-atlantis*. Stresemann takes the latter view and it appears to the present writer the more plausible*. However this may be, the two races of Lesser Black-back, *grællsii* and *fuscus*, are the terminal links of the chain of forms of which the Herring-Gull, *argentatus*, represents the other end, and they overlap completely without any significant interbreeding. Stegmann's reaction to the facts described was to unite this whole assemblage of forms in one species, which would have to be called *Larus fuscus* because *fuscus* is an older name than *argentatus*. But the fact that the Herring- and Lesser Black-backed Gulls of Western Europe breed side by side without crossing (otherwise than as a quite exceptional event) is biologically much more significant and more deserving of emphasis

* The grounds for this opinion cannot be fully discussed here, but it may be mentioned that the fact that the Lesser Black-back in the British Isles is, unlike the Herring-Gull, a migrant, suggests that it is of southern origin, while the fact that the Scandinavian Lesser Black-back (*L. f. fuscus*) is a very dark bird makes it more logical to regard it as the terminal member of the series *atlantis*, *grællsii*, *fuscus* than to read the sequence as *antelius*, *fuscus*, *grællsii* with the darkest race interposed between two less dark ones.

than the fact of their interconnexion through other forms, interesting and important though this is. The terminal members of the chain have quite clearly attained the full biological status of distinct species and to treat them as races of one species is to do violence to the facts of nature. Somewhere along the chain leading from the Herring-Gull-like forms of the other side of the world to the Lesser Black-backs a sufficient degree of difference has been attained to prevent interbreeding when the birds meet again with a Herring-Gull population and the point where that critical degree of divergence is reached marks the origin of a new species. To decide where this critical point may most reasonably be supposed to occur must be mainly a matter of inference and to some extent arbitrary, but this does not affect the biological propriety of making it, as the best approximation to the natural facts that the limitations of nomenclature allow.

In point of fact the dividing line between the species *Larus fuscus* and the rest is not really so very difficult to draw. As Stresemann points out, there is a considerable stretch of the coast of the Bay of Biscay where no large gulls breed and there is no regular intergradation between *atlantis* and *grællsii*. This, then, appears to be the point where the dividing line should be drawn and the British and Scandinavian Lesser Black-backs should be treated as constituting a distinct species, *Larus fuscus*, in the traditional manner. Whether all the other forms should be assigned to a single species, *argentatus*, is perhaps more debatable. In northern Europe there is found yet another race of Herring-Gull known as *omissus*, regarded by Stresemann as derived from *cachinnans*, which it closely resembles, and according to that author probably extending far enough south-eastwards to link up with the parent form in south-east Russia, though this has not been generally recognized. According to Stresemann *omissus* overlaps with *argentatus* in the east Baltic region and apparently does not interbreed with it, which would raise a further nomenclatural problem, but the respective ranges of *argentatus* and *omissus* in northern Europe do not seem to be very conclusively established and the account given by Stresemann conflicts with the conclusions of H. F. Witherby*, so that probably judgment should be suspended in this case pending further information and all the forms under discussion can be assigned provisionally to *argentatus*.

Finally it should be noted that in North America the race *Larus argentatus thayeri*, of the extreme north-east, which in the south of its range merges into *smithsonianus*, intergrades in the Baffin Bay

*Witherby (*Handbook of British Birds*, Vol. v, pp. 95-6) assigns the Herring-Gulls of a much wider area of northern Europe to the form *omissus* than does Stresemann and recognizes no overlap between *omissus* and *argentatus*. Stresemann treats *omissus* as exclusively a yellow-legged form, but Witherby considers that pink-legged birds of north Norway, the Murman coast and the west Baltic are also *omissus*. See also the caption accompanying the map.

region with the Iceland Gull, currently called *Larus glaucoides*. The conclusion seems inescapable that the Iceland Gull, in spite of having no black on the primaries, should be regarded as a race of *argentatus*, although British and American ornithologists have not yet generally adopted this practice.

SUPERSPECIES.

We have seen in the foregoing sections that forms of common origin which have undergone differentiation in isolation may reveal themselves as having attained the status of distinct species when they meet again and are able to occupy the same areas without interbreeding. It will be obvious from what has been said that we should expect to find many other cases where forms which do not overlap, but are clearly so different that they cannot reasonably be regarded as races of one species, are nevertheless similar enough in their general characters to indicate a common origin at no very remote period. In other words if species originate from subspecies in the manner already outlined we should expect to find numerous groups of two or several species inhabiting different regions which are still sufficiently alike, and at the same time sufficiently different from any other species, to indicate that they are all derived from a single ancestral form, and in the case of a successful type we might expect to find members of such a series of representative species distributed over a large part of the world, with perhaps some of them—presumably those which have been longest separated—so far transformed as to be recognizable as members of the group only on rather careful study. This is exactly what is in fact found.

Some of the most striking of such groups of representative species require for their full appreciation a wider acquaintance with the birds of the world than the majority of readers will probably possess, but reference may be made to the assemblage of the Gyr, Lanner, Jugger, Saker and Altai Falcons (*Falco rusticolus*, *biarmicus*, *jugger cherrug*, and *altaicus*) and others, which constitute such a widely dispersed series of related forms, covering together a great part of Europe, Asia, Africa and America. The term superspecies has been proposed to describe such groups.

Smaller groups of closely allied species with neighbouring but not overlapping ranges, with two or three representatives, are quite common, though the opinions of even the most experienced systematists may differ as to which of such forms should be considered as distinct species and which as races of one—here again the subjective element comes in. The Red Grouse (*Lagopus scoticus*) is a case in point. This is currently regarded as a distinct species peculiar to the British Isles, but it is unquestionably the geographical representative of the Willow-Grouse (*Lagopus lagopus*) of Northern Europe, a closely similar bird, which, however, has white wings and central tail-feathers and turns white in winter. If the Red Grouse were now being described for the first time it is quite possible that

it would be considered as merely a very distinct race of the Willow-Grouse, though in fact the differences are pronounced enough to make the traditional procedure quite defensible.

On the whole the modern tendency is towards a somewhat broader conception of subspecies than formerly. A borderline case which will illustrate the point is that of the Pink-footed Goose. The authors of the *Handbook of British Birds* agreed to treat this bird, formerly always regarded as a species, *Anser brachyrhynchus*, as a race of the same species to which the Bean-Goose belongs, so that its name became *Anser fabalis brachyrhynchus* (or as subsequently amended by a decision of the B.O.U. List Committee, *Anser arvensis brachyrhynchus*). If only the Pink-foot and the typical Bean-Goose (*A. arvensis arvensis*) were considered, this might seem a decision with little to justify it, for the two birds have different coloured legs and bills and are so distinct in appearance as to be easily separable in the field. There are, however, individual variants (or, as some have maintained, distinct races) of the Bean-Goose which have pink legs and bills, and the pink and yellow pigments are chemically very closely allied, so that the colour difference is of little significance, while the length of the bill in the Bean-Goose, though normally much greater than in the Pink-foot, is a markedly variable character. In consideration of these facts a number of progressive systematists, including Hartert and Steinbacher (1932-38) in the supplement to the former's great work on Palæarctic birds, have decided that the Pink-foot is best regarded as a race of the Bean-Goose, which it certainly replaces geographically in Spitsbergen, Iceland and east Greenland, and Mr. H. F. Witherby shared this view. The present writer, though recognizing it as entirely reasonable, feels that there is still much to be said for the view that a form so distinct as the Pink-foot is better treated as a distinct species, though it is unquestionably the geographical representative of the Bean-Goose in the countries named. Again the subjective element is involved in a borderline case.

(To be concluded).

CORRECTION.—Owing to an unfortunate printing error for which the Editors are not responsible the symbol for intermediacy on p. 133, line 6, appeared incorrectly. It should of course be \leq

REPORT OF THE BIRD-RINGING COMMITTEE*.

PROGRESS FOR 1948.

A. LANDSBOROUGH THOMSON, C.B., D.SC.

Chairman of the Committee.

THIS is the twelfth report † issued on behalf of the Bird-Ringing Committee of the British Trust for Ornithology, continuing the earlier sequence published under the title "*The British Birds Marking Scheme.*"

MANAGEMENT.

The headquarters of the scheme remain in the British Museum (Natural History), by permission of the Trustees, and rings are marked "BRITISH MUSEUM NAT. HIST. LONDON." The Honorary Secretary, Miss E. P. Leach, has continued to carry out all the work of running the scheme, and to her once more the warmest gratitude must be expressed for her devotion to this laborious task and for her skilful management of all the matters that it involves. Acknowledgment is also made of a generous offer of help from Mr. W. T. C. Rankin, who kindly undertook the analysis of species for the tables in this report.

FINANCE.

The accounts for 1947 and 1948 are being published in the Report of the British Trust for Ornithology.

METHODS.

Considerable difficulty has been experienced since the war, as ringers know, in maintaining a satisfactory standard of rings. Arrangements have been made which it is hoped will show an improvement in the new stocks gradually coming into use.

Reference was made in the last report to Mr. P. A. D. Hollom's manual on trapping methods for ringers, prepared for the Committee. It is hoped that this will be published by the Trust in the course of 1949.

PROGRESS OF RINGING.

Many new ringers have joined the scheme. There are, however, cases in which new entrants, enrolled after considerable correspondence, fail to use any rings: the return of rings in such circumstances would be appreciated.

The number of birds ringed, 39,324, shows an increase of more than 10,000 over the total for 1947, although it is still more than 15,000 short of the peak total achieved in 1939. The number is nearly equally divided between nestlings and trapped birds, with a slight advantage in favour of the former.

Species ringed for the first time under the scheme are the Ruff (one at Isle of May), Snow-Bunting (one at Isle of May; four at

*A publication of the British Trust for Ornithology.

†The previous report was published in *Brit. Birds*, Vol. xli, pp. 295-300.

Fair Isle) and Woodchat Shrike (one at Skokholm). The Turnstone figures for the second time, 13 birds having been trapped by Mr. P. A. Rayfield at Aultbea, Wester Ross.

The ringing done at Bird Observatories forms an important part of the scheme. The number of different species marked at these is notable:—Isle of May, 47; Spurn Head, 44; Skokholm, 42; Fair Isle, 39. Other ringers also showed wide variety in this respect:—Messrs. Ash and Ridley, 65; London Natural History Society, 60; Messrs. Cowin, Crellin and Ladds, 58; Mr. F. D. Walls, 45. The totals of individuals marked are shown in Table II, headed by the Skokholm Bird Observatory with a figure of very nearly 8,000.

RECOVERIES.

Apart from the accumulation of data which will prove valuable on analysis, there are many new recoveries of individual interest and some of these may be mentioned.

A Red-backed Shrike ringed in the New Forest as a nestling was recovered at Winchelsea, about 100 miles to the east, a little more than a month later. A Willow-Warbler ringed at the Isle of May Observatory on autumn migration was caught at Spurn Head Observatory a fortnight later. Another Willow-Warbler, ringed on the Isle of May on spring migration, was recovered twelve days later in Cærnarvonshire, over 200 miles S.S.W., an unexpected direction. A Blackbird ringed in Ross-shire in March was recovered in Norway (lat. 62°N.) in a subsequent January, suggesting that it had migrated to this country in one winter but not in the later one. Few of our native Blackbirds are recovered abroad, but a nestling from Wimbledon was recovered in Brittany in January three and a half years later.

Wheatears ringed as nestlings in Lancashire and on Fair Isle were recovered, respectively, in Gironde, France, in August and in northern Portugal in the third week of September in the same year.

The first Nightjar to be recovered abroad under the scheme was ringed as a nestling near Bristol in 1947 and recovered in Lot et Garonne, France, in October, 1948. Shags ringed on Lundy Island have been reported from Brittany and Denmark: hitherto there had been only two recoveries abroad for this species. Recoveries of Gannets from inside the Mediterranean have been few, but there has recently been one from Perpignan, southern France. Manx Shearwaters ringed as young on Skokholm have been recovered from inland localities, including Malmesbury, Cheltenham and Verdun: this last record, from eastern France, was within a week of the date of ringing.

Two Arctic Terns ringed as chicks by the Manx Field Club have been recovered in the same ternery after ten years.

PUBLICATION OF RESULTS.

The following publications have been made since the last report:—E. O. Höhn (1948). "Mortality of adult and young Mallards." *Brit. Birds*, Vol. xli, pp. 233-235.

D. Lack (1949). "Apparent survival-rate of ringed Herons." *Brit. Birds*, Vol. xlii, pp. 74-79.

D. Lack (1949). "Vital statistics from ringed Swallows" *Brit. Birds*, Vol. xlii, pp. 147-150.

E. P. Leach (1948). "British recoveries of birds ringed abroad." *Brit. Birds*, Vol. xli, pp. 174-178, 204-208.

E. P. Leach (1948). "Recovery of marked birds." *Brit. Birds*, Vol. xli, pp. 362-374.

NUMBER OF BIRDS RINGED.

				<i>Trapped. Nestlings. Total.</i>		
In 1948	..	..	..	18,413	20,911	39,324
„ 1947	..	..	..	14,574	14,007	28,581
„ 1946	..	..	..	8,909	8,412	17,321
„ 1945	..	..	..	1,875	5,419	7,294
„ 1944	..	..	..	1,183	5,313	6,496
„ 1943	..	..	..	660	3,920	4,580
„ 1942	..	..	..	1,301	3,266	4,567
„ 1941	..	..	..	3,109	3,990	7,099
„ 1940	..	..	..	14,974	6,208	21,182
„ 1939	..	..	..	27,983	27,834	55,817
From 1909 to 1938	..	..	..	..	..	626,238
Grand Total (including arrears) 819,821.						

INDIVIDUAL TOTALS FOR 1948.

	<i>Trapped</i>	<i>Nest-</i> <i>lings</i>	<i>Total</i>		<i>Trapped</i>	<i>Nest-</i> <i>lings</i>	<i>Total</i>
Skokholm Bird				Bruce Campbell	38	363	401
Obs. ...	4934	3062	7996	W. Howe	6	394	400
I. of May Bird				R. F. Dickens	213	163	376
Obs. ...	712	476	1188	W. Rankin and			
Midlothian O.C.	334	769	1103	Birkenhead Sch.	270	92	362
Cowin, Crellin &				R. H. Brown	8	346	354
Ladds	41	1054	1095	A. E. Male	194	137	331
Edward Grey Inst.	112	866	978	Bootham Sch.	284	24	308
F. D. Walls	249	577	826	J. Bartholomew	5	289	294
Oxford Orn. Soc.	706	85	791	R. Carrick	98	192	290
Ash & Ridley	219	546	765	Lundy Bird Obs.	79	211	290
Spurn Bird Obs.	735	28	763	M. Barras-Smith	266	23	289
R. M. Band	470	280	750	Fair Isle Bird			
Wildfowl Inq.				Obs. ...	235	53	288
Ctee. ...	670	—	670	L. A. Cowcill	114	155	269
J. J. Boon	20	609	629	Oundle Sch.	2	266	268
John Lees	359	265	624	R. A. Richardson	92	175	267
London N.H.S.	289	326	615	Clayesmore Sch.	241	6	247
C. B. Wainwright	459	136	595	F. M. Gurteen	131	109	240
A. Darlington	222	369	591	Leighton Park			
G. Edwards and				Sch. ...	124	112	236
Halifax Zool.				Blundell's Sch.	187	48	235
Group...	555	36	591	P. A. Rayfield	124	107	231
R. H. Poulding...	17	559	576	F. J. Brown	140	88	228
Charterhouse B.C.	14	532	546	Bryanston Sch.	33	187	220
John Southern	240	295	535	J. W. Wainwright	146	67	213
E. Cohen	75	439	514	A. E. Billett	2	206	208
G. R. Mountfort	256	166	422	F. R. Allison	122	52	174
Shrewsbury Sch.	113	292	405	Ackworth Sch.	78	92	170

	<i>Trapped</i>	<i>Nest- lings</i>	<i>Total</i>		<i>Trapped</i>	<i>Nest- lings</i>	<i>Total</i>
Zool. Society ...	128	41	169	R. F. Ruttledge	12	72	84
Sherborne Sch. ...	3	162	165	Repton Sch. ...	15	65	80
The late T. R. Goddard ...	—	162	162	J. M. B. King ...	69	10	79
P. V. Robinson ...	77	85	162	D. Leaver ...	—	79	79
W. A. Cadman ...	93	65	158	A. M. Watt ...	22	55	77
N. A. Redfern ...	16	140	156	G. F. Dixon ...	21	55	76
K. G. Spencer ...	26	122	148	G. F. Raeburn ...	4	72	76
Lord D. Stuart	101	45	146	J. Warham ...	38	38	76
I. D. Pennie ...	43	101	144	A. W. Heward ...	75	—	75
B. Astin ...	—	142	142	J. Ferguson Lees	14	57	71
I. Appleyard ...	18	123	141	D. R. Anderson	52	17	69
J. Fisher ...	21	118	139	P. W. Hinde ...	7	61	68
J. D. Mills ...	106	27	133	A. B. Walker ...	61	6	67
D. R. Mirams ...	60	73	133	R. Whittenbury	9	57	66
A. Cross ...	99	33	132	R.M.A. Sandhurst			
Winchester Coll.	74	58	132	O.S. ...	21	42	63
R. Chislett ...	99	32	131	Univ. Coll. N.			
D. Goodwin ...	25	102	127	Wales ...	61	—	61
Norman Southern	3	123	126	T. G. Walker ...	40	20	60
Dublin F.C. ...	1	120	121	H. A. Clements...	29	30	59
Mrs. Upton ...	76	45	121	O. A. Dod ...	54	3	57
M. C. Glasman ...	5	115	120	A. V. Millard ...	5	50	55
Barrow N.F.C. ...	73	42	115	F. W. Fox ...	24	30	54
J. Cunningham...	115	—	115	H. G. Hurrell ...	29	24	53
P. E. Davis ...	29	81	110	M. P. Winser ...	33	20	53
E. G. Holt ...	81	26	107	A. N. Sykes ...	51	—	51
J. Cassera ...	33	72	105	W. S. Wright ...	8	43	51
H. Schofield ...	102	—	102	J. C. Morris ...	50	—	50
C. P. Rawcliffe	4	94	98	Brooker and			
Dauntsey's Sch.	89	7	96	Cawkell ...	—	49	49
Miss R. Levy ...	19	76	95	R. W. Arthur ...	7	41	48
R. G. Vint ...	78	14	92	J. M. Cullen ...	37	11	48
Cambridge B.C.	3	88	91	D. A. Illingworth	2	45	47
P. E. Morshead	1	89	90	J. J. Boswell ...	28	18	46
J. McMeeking ...	34	56	90	J. P. Kyd ...	36	10	46
L. G. Weller ...	50	37	87	A. Baptie ...	45	—	45
James and				H. E. Jenner ...	6	39	45
Hayward ...	38	46	84	A. P. Place ...	45	—	45

Many other Ringers ringed smaller numbers.

NUMBERS OF EACH SPECIES RINGED.

RECOVERED.

	1909 to 1947	1948 Trapped	1948 Nest- lings	1948 Total	Grand Total	of those ringed 1909-47	Per- centage
Raven ...	306	1	20	21	327	27	8.8
Crow, Carrion ...	2115	7	91	98	2213	102	4.8
Rook ...	5164	35	147	182	5346	270	5.2
Jackdaw ...	4429	68	142	210	4639	226	5.1
Magpie ...	1547	5	92	97	1644	56	3.6
Jay ...	693	5	33	38	731	46	6.6
Chough ...	60	—	4	4	64	3	5.0
Starling ...	73737	3689	361	4050	77787	3335	4.5
Greenfinch ...	32181	280	486	766	32947	2472	7.7
Goldfinch ...	669	3	21	24	693	9	1.3
Redpoll, Lesser ...	635	—	17	17	652	6	0.9

NUMBERS OF EACH SPECIES RINGED.

RECOVERED.

			1909 to 1947	Trapped	1948 Nest- lings	Total	Grand Total	of those ringed 1909-47	Per- centage
Linnet ...	...	...	10979	135	269	404	11383	73	0.7
Bullfinch ...	...	...	1835	9	70	79	1914	63	3.4
Chaffinch ...	...	...	35592	948	682	1630	37222	1543	4.6
Brambling ...	...	...	1062	17	—	17	1079	41	3.9
Sparrow, Tree-	...	...	2655	21	31	52	2707	88	3.3
Bunting, Yellow	...	...	6440	51	189	240	6680	417	6.5
Bunting, Reed-	...	...	2220	12	77	89	2309	95	4.3
Lark, Sky-	...	...	3780	9	62	71	3851	48	1.3
Pipit, Tree-	...	...	2084	5	44	49	2133	7	0.3
Pipit, Meadow-	...	...	6139	124	105	229	6368	160	2.6
Pipit, Rock-	...	...	852	22	14	36	888	42	4.9
Wagtail, Yellow	...	...	1295	33	50	83	1378	4	0.3
Wagtail, Grey	...	...	1039	7	47	54	1093	3	0.3
Wagtail, Pied	...	...	7316	101	189	290	7606	105	1.4
Shrike, Red-backed	...	...	980	4	58	62	1042	5	0.5
Flycatcher, Sptd.	...	...	3768	68	227	295	4063	15	0.4
Flycatcher, Pied	...	...	2001	49	371	420	2421	11	0.5
Chiffchaff ...	...	...	1186	54	31	85	1271	7	0.6
Warbler, Willow-	...	...	11468	1259	361	1620	13088	61	0.5
Warbler, Wood-	...	...	1170	6	70	76	1246	2	0.2
Warbler, Sedge-	...	...	1561	58	50	108	1669	8	0.5
Warbler, Garden-	...	...	1422	19	24	43	1465	5	0.4
Blackcap ...	...	...	1091	27	46	73	1164	2	0.2
Whitethroat	...	...	5680	551	123	674	6354	63	1.1
Thrush, Mistle-	...	...	5411	17	88	105	5516	121	2.2
Thrush, Song-	...	...	71750	318	849	1167	72917	1507	2.1
Redwing ...	...	...	986	21	—	21	1007	9	0.9
Ouzel, Ring-	...	...	662	—	23	23	685	7	1.1
Blackbird ...	...	...	64187	986	1287	2273	66460	3183	5.0
Wheatear ...	...	...	2333	34	112	146	2479	73	3.1
Whinchat ...	...	...	1841	19	41	60	1901	12	0.7
Stonechat ...	...	...	1080	2	12	14	1094	7	0.6
Redstart ...	...	...	2630	51	136	187	2817	18	0.7
Robin ...	...	...	24863	865	427	1292	26155	2350	9.4
Sparrow, Hedge-	...	...	15736	436	244	680	16416	1446	9.2
Wren ...	...	...	3922	69	21	90	4012	31	0.8
Dipper ...	...	...	1940	17	136	153	2093	26	1.3
Swallow ...	...	...	48934	78	1161	1239	50173	436	0.9
Martin, House-	...	...	13248	62	245	307	13555	84	0.6
Martin, Sand-	...	...	5201	52	56	108	5309	30	0.6
Swift ...	...	...	1255	98	36	134	1389	68	5.4
Kingfisher ...	...	...	773	1	10	11	784	34	4.4
Cuckoo ...	...	...	882	8	37	45	927	24	2.7
Owl, Little	...	...	866	8	19	27	893	74	8.5
Owl, Long-eared	...	...	259	1	30	31	290	10	3.9
Owl, Barn-...	...	...	745	10	51	61	806	85	11.4
Owl, Tawny	...	...	1300	9	68	77	1377	77	5.9
Falcon, Peregrine	...	...	110	—	5	5	115	14	12.7
Merlin ...	...	...	316	2	5	7	323	56	17.7
Kestrel ...	...	...	1157	5	58	63	1220	119	10.3
Buzzard ...	...	...	474	—	40	40	514	19	4.0
Hawk, Sparrow-	...	...	865	11	17	28	893	120	13.9
Heron, Common	...	...	2406	—	33	33	2439	313	13.0
Duck, Sheld-	...	...	484	3	9	12	496	23	4.8
Mallard ...	...	...	7070	123	115	238	7308	1131	16.0
Teal... ..	...	...	5398	491	—	491	5889	670	12.4

NUMBERS OF EACH SPECIES RINGED.

RECOVERED.

		1909	1948		Grand	of those	Per-
		to	Trapped	Nest-			
		1947		lings	Total	1909-47	centage
Wigeon ...	...	458	26	—	26	484	15.7
Duck, Tufted ...	...	302	3	—	3	305	19.9
Goosander ...	...	52	—	—	—	52	19.2
Cormorant ...	...	2823	5	45	50	2873	22.1
Shag ...	...	2116	5	105	110	2226	10.0
Gannet ...	...	11860	11	376	387	12247	3.7
Petrel, Storm-	...	905	42	2	44	949	4.9
Shearwater, Mx.	...	27432	3664	2257	5921	33353	4.3
Petrel, Fulmar	...	574	12	124	136	710	0.9
Pigeon, Wood-	...	4166	—	142	142	4308	4.4
Dove, Stock-	...	913	7	42	49	962	8.1
Dove, Turtle-	...	745	7	9	16	761	10.3
Curlew, Common	...	3481	5	102	107	3588	4.1
Woodcock ...	...	5413	2	27	29	5442	7.7
Snipe, Common	...	1845	—	51	51	1896	5.0
Dunlin ...	...	140	1	—	1	141	1.4
Sandpiper, C.	...	1055	8	49	57	1112	0.5
Redshank ...	...	2562	3	72	75	2637	3.2
Plover, Ringed	...	1688	10	87	97	1785	1.3
Plover, Golden	...	382	—	6	6	388	2.6
Lapwing ...	...	42905	28	1101	1129	44034	2.2
Oyster-catcher	...	2248	6	212	218	2466	4.7
Curlew, Stone-	...	267	—	6	6	273	3.7
Tern, Sandwich	...	18713	—	821	821	19534	1.7
Tern, Roseate	...	551	—	271	271	822	0.2
Tern, Common	...	20299	1	201	202	20501	2.4
Tern, Arctic	...	3341	—	114	114	3455	0.5
Tern, Little	...	944	—	39	39	983	0.9
Gull, B.-headed	...	14531	71	195	266	14797	4.9
Gull, Common	...	2576	5	131	136	2712	4.3
Gull, Herring-	...	9441	54	898	952	10393	2.9
Gull, L. Bl.-bkd.	...	11505	54	450	504	12009	3.8
Gull, G. Bl.-bkd.	...	742	6	78	84	826	4.4
Kittiwake ...	...	2316	14	171	185	2501	1.5
Skua, Great	...	656	1	117	118	774	3.7
Razorbill ...	...	5620	135	329	464	6084	2.4
Guillemot ...	...	2802	14	184	198	3000	2.3
Puffin ...	...	6054	196	99	295	6349	1.6
Crake, Corn-	...	587	1	8	9	596	1.5
Moorhen ...	...	1991	67	5	72	2063	3.2

NOTES.

GATHERING OF RAVENS.

THE gathering of Ravens (*Corvus corax*) at roosts and elsewhere in Wales (*antea*, Vols. xxxix, p. 52, xl, p. 209, xli, p. 19,) appears to have certain features in common with gatherings of Ravens on Wideford Hill near Kirkwall, Orkney, in 1942 and 1943.

On several occasions between November, 1942, and the end of April, 1943, Ravens gathered around the flattish heather-covered top of Wideford Hill, which is about 750 feet above sea level. This usually occurred between 3 p.m. and 4 p.m. and the birds appeared from all directions.

Thus on November 25th, 1942, there were three or four pairs of Ravens at 3 p.m., but 25 birds by 3.20 p.m. They ranged over the west side of the hill, indulging in dives and corkscrew turns, gaining height from 50 feet above the hillside to an estimated 800 to 1,000 feet, gradually covering a wider area and finally dispersing, generally towards the north-west, with a party of ten going north and a single pair going south. Of these 25 Ravens seven pairs could be made out at various times. About three pairs of Ravens remained on the hill.

On November 28th three Ravens were seen on Wideford Hill and on December 1st three pairs. On January 22nd, 1943, a gathering of 10 to 12 pairs similar to that seen on November 25th took place.

At about 4 p.m. on April 29th, 1943, eight Ravens were seen on the east slope of Wideford Hill. During the next half hour they were joined by three more and circled the hill at a height of several hundred feet. Then eight Ravens flew east and then south in a distinct and clearly seen line formation, one behind another, with the other three following. They slowly gained height to about 1,000 feet over the hill, forming two groups in line abreast order, and dispersed about 4.45 p.m., some towards the island of Shapinsay. Ravens seldom perched on the hilltop.

Although a number of Ravens used to feed on slaughterhouse offal dumped in fields a mile from Wideford Hill none was seen leaving or returning to this area. The nearest cliffs of any size are three to four miles away, and no traces of a roost were found there or elsewhere in the vicinity.

R. HEWSON.

COURTSHIP FEEDING OF STARLING.

ON April 22nd, 1947, at 6.15 a.m. (G.M.T.) at Egham, Surrey, I observed a Starling (*Sturnus vulgaris*) perching on a wireless aerial. Another Starling flew up from the ground, perched beside it and transferred something from its beak to that of the perching bird. It then flew up, fluttered above the perching bird and half-landed on its back—obviously attempting coition. As it was unsuccessful it flew back to the ground and after a few moments returned and

repeated the feeding and again attempted coition. Again it was unsuccessful and flew down. The whole procedure was repeated again without any successful coition, when the perching bird flew away and was followed by the other bird. J. O. OWENS.

[We have only one other record of courtship feeding by Starlings (*antea* pp. 118-9) and the behaviour would appear to be unusual. —EDS.]

IRREGULAR LAYING OF GREENFINCH.

ON April 25th, 1948, I found the nest of a Greenfinch (*Chloris chloris*) under construction in Sale, Cheshire. Laying began on April 29th and by the evening of 30th, there was still only one egg. On May 3rd there were only two eggs and on the 4th there were three eggs. There were still three on the 5th. On the 6th the fourth egg was laid after which incubation began. JOHN SOUTHERN.

CALL OF LITTLE BUNTING AND SONG OF BLUETHROAT.

THE purpose of this note is to correct two statements of mine as given in *The Handbook*.

Little Bunting (*Emberiza pusilla*). Vol. i, p. 138. "Note of migrants is very characteristic, a high, quiet 'pwick', rising slightly and very curtailed (L. S. V. Venables). Alarm-note described as low 'tic, tic, tic' (E. R. Alston and J. A. Harvie-Brown); perhaps the same." I would suggest that this call, which I heard on Fair Isle in September, 1936, probably is the alarm-note because when on Fair Isle in September, 1948, I twice heard a Little Bunting give what is presumably its true call-note. This I noted down as "'tsew"; as with Reed-Bunting but higher and more musical."

Red-spotted Bluethroat (*Luscinia svecica*). Vol. ii, p. 194. "Song . . . a characteristic [phrase] is a fine, full-toned 'torr-torr-torr-torr' ". I made this observation in Swedish Lapland in birch forest where huge numbers of Redwings (*Turdus musicus*) were singing their nesting-song which contains a phrase similar to this. On a subsequent visit to Finnish Lapland, in a locality where Redwings were rare, the Bluethroats were not heard singing this and I suggest that the Swedish birds were imitating the surrounding Redwings, for their song is strongly imitative. L. S. V. VENABLES.

RED-BREASTED FLYCATCHER IN SUSSEX.

ON April 29th, 1948, I watched a small bird, which was evidently a female Red-breasted Flycatcher (*Muscicapa parva*), for a few minutes by the side of a road near Handcross, Sussex. It was noticeably smaller than the Spotted Flycatcher (*Muscicapa striata*) and very shy and secretive, only making short flights from twig to twig in the lower branches of a tree and the upper-part of a thick hedge, except for once flying across the road and once coming down low and thence momentarily to the ground. The following particulars were noted. Upper-parts greyish-brown and head much the same

colour, though darker. White throat and under-parts, the former tinged buff. Tail dark with a broad white patch on each side at the base; it was frequently flicked and on occasion held cocked over the back. The only note heard was, once, a very subdued and short chattering call. *The Handbook* gives only one record of this bird for Sussex, though Walpole-Bond (*History of Sussex Birds*) allows some seven more.

I. J. FERGUSON LEES.

MISTLE-THRUSH SWIMMING.

MR. Fred S. Tritton's note (*antea*, Vol. xl, pp. 179-180) on a Wren (*Troglodytes troglodytes*) swimming prompts me to put on record an observation which I made on May 6th, 1945, in the Forêt de Bord, near Elbeuf, Seine Inférieure. A Mistle-Thrush (*Turdus viscivorus*) was hopping along a forest track bordered by wide, deep ditches which had recently been flooded by a storm. To my astonishment I saw the bird go into one of the pools thus formed, bathe and then swim round on the surface of the water. It used its wings a little to assist it in swimming, but moved them quite slowly. In this way it circled round several times before leaving the water, rearranging its plumage and flying off.

I subsequently measured the depth of this small pool and found that it was between 10 and 14 inches, varying from place to place. There is therefore no doubt that this Mistle-Thrush was swimming, apparently for the fun of it, and incidentally was doing so with what seemed to be perfect ease and confidence.

GEORGES OLIVIER.

SONG-THRUSH SONG IN AUGUST.

MR. D. M. JONES has sent me full particulars of song heard by him during August, 1948 from Song-Thrushes (*Turdus ericetorum*) in gardens at Portchester, Hants. He was able to record song on all but six days during the month. At the beginning of the month four individuals were still in song, and on some days (e.g. August 9th) he recorded "fairly continuous song all day." In the last week only one bird sang, and that one only in "a few bursts." Song did not continue into September. In previous years Mr. Jones has heard no song in August. He remarks that only "garden birds" were singing; other thrushes in the district had stopped singing about July 20th. Such sustained song right through August seems to be quite exceptional.

H. G. ALEXANDER.

MULTIPLE NEST-BUILDING BY BLACKBIRDS.

DURING the winter of 1947-8 a friend of ours stacked a dozen lobster creels in a shed near Loch Spiggie, Shetland, and on April 4th he noticed a Blackbird (*Turdus merula*) carrying nest-material in by way of a broken window. We visited the place on April 13th and found the creels (the usual construction of net stretched over a frame with a funnel entrance) piled against a wall in three contiguous stacks of four each. The nearest stack to the broken window (ten feet away) had apparently completed nests in the top and second

creels ; the next stack had an unlined nest in the top creel, while the third stack, again in the highest creel, held an incomplete nest. On April 14th the top nest in the stack nearest the window held the first egg of a clutch of four, three of which hatched, and the young successfully flew about mid-May. On May 17th the first egg of the second c/4 was laid in the same nest, which still contained the infertile egg of the first set. The birds therefore incubated five eggs this time ; an object-lesson to students of clutch-size ! The four eggs of the second laying all hatched and the four young left on June 16th or 17th.

On going to collect the creels on August 2nd we were astonished to find the Blackbird sitting once again on the same nest. This time she had laid a c/3. (The infertile egg of the first clutch disappeared during the fledging of the second brood). The other creels were all removed and we put hers on a box, thus lowering it 26 inches. She solved this problem correctly and next day we found her incubating in her new position. The eggs were hatching on August 8th, which indicates that they were laid about July 22nd to 25th. The three chicks were all in the nest on August 21st, but on the morning of August 22nd one was out in the shed and the other two were wandering about in the creel searching for the somewhat baffling exit. By mid-afternoon the second had escaped and the third got out in the early evening.

Clearly the evenly stacked lobster creels, each an exact duplicate of the others, had confused the birds when building with a problem seldom, if ever, presented in nature. However, the laying of the first egg fixed the place and habit and, after this at latest, no more work was done on the other nests. References to other cases of multiple nest-building in such artificial situations will be found in *Brit. Birds*, Vol. xli, p. 348 by A. R. Lucas and the Editors.

L. S. V. AND U. M. VENABLES.

OBSERVATIONS ON ROBINS IN LATE WINTER.

IN January and February, 1948, I made some brief observations on Robins (*Erithacus rubecula*) at an area in Burnley, Lancashire. The ground covered (18 acres) was ideal "Robin country," consisting of a small river-valley, extensive lawns, several gardens, and deciduous woodland liberally "edged" with rhododendrons, etc. The total area actively occupied by Robins was about 16 acres. The more open parts of the lawns were avoided and seemed "ownerless," whilst copses without undergrowth, though sometimes included in a Robin's "possessions" were similarly little frequented. In mid-February there were 17 territories (one held by a newly-formed pair), each roughly equal in area, only one (c.1,250 sq. yds.) being abnormally small. Males were decidedly in the majority ; not more than two pairs were formed before the end of February, several weeks later than Lack (*Life of the Robin*) found in S. England. Song was at its best on humid days and in dense fog ; prolonged frost was the chief deterrent.

K. G. SPENCER.

ABNORMAL SONG OF HEDGE-SPARROW.

IN my garden in Cambridge in the evening of July 23rd, 1948, my attention was suddenly arrested by an entirely unfamiliar bird's song. Observation then and later established with certainty that the bird was a Hedge-Sparrow (*Prunella modularis*), and there was nothing (apart from its song) to suggest that it was not the common British bird. During the days that followed I watched the bird frequently and under perfect conditions, often from a distance of only a few yards, and often whilst it was actually singing and so close to me that the movements of its beak could be easily seen. The song, however, was widely different from the normal, familiar, song of the Hedge-Sparrow. It consisted of two alternating notes of slightly differing pitch, in speed and rhythm comparable with the "saw-sharpening" song of the Great Tit, though quite unlike it in quality and with a narrower interval (in the musical sense) between the pitch of the two notes. The alternations were repeated, sometimes only three or four times, sometimes as many as eight or nine times. A good indication of the song can be given by comparing it to the sound made by those rubber dolls or animals children have with a whistle fixed in them: the alternating notes of slightly different pitch made by alternately squeezing and releasing the toy are not unlike this bird's song. The comparison also suggests the somewhat wheezing quality the song had—not a clear whistle; and in this respect only was there resemblance to the Hedge-Sparrow's normal song. In volume it was louder than the normal song, and audible from a greater distance. To anyone familiar with the songs of British birds the song was so unlike any other that it immediately arrested attention, and with me, when I first heard it, it produced the disconcerting experience of hearing a song close at hand but being quite unable to associate it with any known bird.

A short spell of hot weather had set in just before July 23rd. During the hot days that followed the bird sang frequently and remained within a small area. Later it moved further away, though I could from time to time hear it in the distance. Later still, I heard it only occasionally, but not after about August 15th. The earlier part of August was, however, very wet. I had not heard the song at any earlier time of the year. Had it occurred in my garden earlier, I should certainly have noticed it.

J. S. BOYS SMITH.

WREN FEEDING YOUNG ON FISH.

WITH reference to the note by K. Brown on a Pied Wagtail feeding its young on fish (*antea*, Vol. xli, p. 214), it may be worth recording that in the early '20's, I think 1923, I saw a Wren (*Troglodytes troglodytes*) with the same habit. This was at the trout-hatchery at Nailsworth, Gloucestershire, run by my old pupil, D. F. Leney. A Wren had made its nest inside the old mill-building in which were

situated the troughs containing the young trout in the early (yolk-sac) stages after hatching. The Wren (or Wrens—I do not think that Leney had been able to establish whether both parents had taken advantage of the situation) fed the young in the nest largely or entirely on them, flying down to perch on the edge of the trough and pick out the fry near the surface.

J. S. HUXLEY.

SAND-MARTIN IN SURREY IN JANUARY.

AT 8.30 a.m., on January 2nd, 1948, at Egham, Surrey, I was surprised to see a Sand-Martin (*Riparia riparia*). It was perched on the edge of a chimney and as I was on the top deck of a bus I had a perfect view of the bird. I watched it for about two minutes as the house was by a stopping place. During this time the bird was constantly shifting its position and I have no doubt as to its identity. The typical hirundine shape, with tail only slightly forked, light brown upper-parts and white under-parts with brown band across the throat were all clearly observed and noted in my diary at the time.

J. O. OWENS.

STATUS OF GREEN WOODPECKER IN LANCASHIRE.

THE increase and spread of the Green Woodpecker (*Picus viridis*) in Lancashire during the past decade merits close attention, connected as it probably is with marked increases or decreases elsewhere in north Britain.

In 1884 F. S. Mitchell could only refer to two districts in the county where breeding was known to occur (*cf. Birds of Lancashire*, 2nd Edn., 1892, p. 107). Thanks to the co-operation of a number of careful observers the present range has been thoroughly worked out. An increase was apparent in 1938, the bird having become well established locally in central Furness, the lower Lune valley, and in the Ribble valley east of Preston to Longridge Fell, whilst nesting had even taken place in one or two southern localities. This increase, though genuine, was relatively slow, but since 1940 the spread of the species has been remarkable in the country south of the River Wyre and in the Ribble basin; for instance in one area alone near Preston, where a solitary pair nested in 1939, no less than seven pairs bred in 1947. Further east six additional pairs were located in 1946 and many paired birds were discovered at new sites in 1947 and 1948. In southern districts, and especially in the south-east, successful breeding has recently occurred in places where the bird has been unknown within living memory—even as a vagrant—and the influx of wintering birds near a southern mossland is a clear indication of changes that have taken or are taking place.

The rapidity of the increase from 1941 to 1947, a period, it may be remembered, coinciding with the felling of timber on a widespread scale in north England, can hardly fail to arouse the suspicion that a shift of population has taken place owing to the destruction of breeding haunts outside the faunal area. The later and more

spectacular phase of the increase is definitely suspect. That it is closely linked with habitat destruction in recent times is reasonably certain and a proportionate increase of the Great Spotted Woodpecker (*Dryobates major*) in many parts of the county affords confirmation.

CLIFFORD OAKES.

BUZZARD DROWNED AFTER SETTLING ON SEA.

ON July 7th, 1948, on the Isle of Eigg, I was watching Common Buzzards (*Buteo buteo*), one of which was being half-heartedly mobbed by sea-birds as it flew over the water. Presently it descended lower and, although now unmolested, it surprisingly landed on the sea and sat there serenely for perhaps 15 seconds. By the time I had focussed my binoculars it was unsuccessfully attempting to take off. Later, it seemed to be trying deliberately to regain dry land by thrusts of its powerful wings, but although aided by following wind and waves, it gave up the unequal struggle after being at least 20 minutes in the water.

The sea-birds had shown the liveliest concern once the Buzzard was sea-borne, and I could see nothing vindictive in their incessant swoops over the scene of the tragedy. I must stress again that the unfortunate bird had been under no apparent compulsion to land as it did.

A fisherman kindly retrieved the body for me ; the wing-span was found to measure nearly four feet, and the length was 21 inches. The bird was therefore at least a first year adult.

I should be interested both in explanations of this unusual incident and in any similar experiences which readers may have had.

M. DAY.

MARSH-HARRIER IN SUSSEX.

ON August 15th, 1948, we flushed an immature Marsh-Harrier (*Circus aeruginosus*), in the deep chocolate-coloured plumage with yellow crown and throat, from an extensive reed-bed near Crawley, Sussex. It circled round low before making off in an easterly direction. J.A.S. considers he saw the same bird near Handcross on August 29th. As this bird is seldom seen away from its breeding-haunts, we think this worthy of record.

I. J. FERGUSON LEES, J. A. SMITH.

BITTERN NESTING IN KENT.

IN the *South Eastern Bird Report* for 1947, several observers have commented on the presence of Bitterns (*Botaurus stellaris*) in spring and summer in Kent. In these circumstances it is considered appropriate to place on record that there is little, if any, doubt that the Bittern has bred in Kent sporadically since 1938.

Of recent years more birds have been in evidence ; several males were booming in 1946-7, and in the spring of 1948 at least three were answering one another ; also a nest was found in May, which so far as my knowledge goes is the first to be discovered in the county.

T. C. GREGORY.

LARGE NUMBERS OF BLACK-TAILED GODWITS IN SUSSEX.

WITH reference to my note (*antea* Vol. xli, p. 219) concerning the considerable migration of Black-tailed Godwits (*Limosa limosa*) through Thorney, Sussex, in 1947, I write to record that a similar but larger migration occurred in 1948. Besides myself, many observers noted these birds including Messrs. J. A. Walpole-Bond, G. des Forges, H. A. W. Southon, F. M. Gurteen, S. Bayliss-Smith, D. L. Dunkin, C. W. G. Paulson, L. P. Alder, C. M. James, G. A. Hebditch, J. A. Smith and J. H. Boswall, some of whom have kindly let me have details of the numbers on days when I was not there.

The following totals were recorded in the autumn :—August 1st, 23 ; August 8th, over 300 (291 counted) ; August 15th, 100 ; August 21st, 315 ; August 22nd, 200 ; September 5th, 457 ; September 7th, 520 ; September 10th, 400 ; September 19th, 700 ; September 26th, 26 ; October 3rd, 450-500 ; October 10th, none ; October 17th, 500 ; October 24th, none. About 70 were present to the end of the year.

Thorney is only used as a resting-place at high tide by these birds. I consider that many of them spent the three months at Thorney, the fluctuating numbers being caused by the choice of an alternative place to rest at the high tides, which has not yet satisfactorily been found. Probably the lower high-tides leave small areas of mud uncovered.

I. J. FERGUSON LEES.

RED-NECKED PHALAROPE AND LITTLE STINT IN CO. WEXFORD.

I WAS present near the North Slob, at Wexford, from August 25th-29th, 1948, just after a period of three days of very stormy weather, with strong winds from a westerly direction. During the following few days conditions improved considerably and I was able to observe the two species mentioned below to excellent advantage. Both were seen on the channel near the Pumping Station, with the aid of 7 x 50 binoculars.

Red-necked Phalarope (*Phalaropus lobatus*). On August 25th, the day immediately after a gale from the south-west, I observed a bird of this species among a flock of seven Dunlin (*Calidris alpina*). It was just out of summer plumage and still retained the red or dark orange patches on either side of the neck, which, however, did not meet in front of the throat. A white patch below the eye, and between the orange or red markings and the greyish-brown plumage of head and nape, was a particularly noticeable feature. The throat below the orange was streaked a very light brown. The rest of the under-parts were white. The wings and back, when resting, were dark brown, flecked with a lighter brown. In general behaviour it was far less energetic than the Dunlin and kept to the edge of the party. The slender bill was black, as also appeared the legs. When I approached closer (within 20 yards), in order to make more detailed notes, it hurried in among the Dunlin and the whole flock

flew off, with the phalarope slightly behind the rest. I was able to make out the wing pattern, which was very dark, much more so than its companions, and a very marked white wing-bar. I looked for it again during my visits, but did not succeed in finding it.

Little Stint (*Calidris minuta*). A single bird observed beside one of a small group of Dunlin on August 28th. It was surprisingly tame and I was able to approach immediately within 15 feet and noted the following:—Considerably smaller than Dunlin (length estimated to be about one inch less) ; head light rufous with a light white eye-stripe ; nape light brown, with white on sides of neck ; back rufous with certain feathers giving the appearance of two white lines nearly meeting at the tail, making a rough V-shaped white marking ; under-parts very white ; legs and bill black. Its cry was a series of notes which I interpreted as “sitt, sitt, sitt,” etc. *The Handbook* records this species as very rare in all but the bays of Dublin and Belfast, which is due, I feel sure, to the apparent absence of observers, during the periods of migration, at other suitable places, like the North Slob, on the East Coast.

J. F. SIMMS.

TEMMINCK'S STINT IN BERKSHIRE IN MARCH.

DURING the morning of March 18th, 1948, at Ham Fields, Berkshire, I was watching a flock of 55 Redshank (*Tringa totanus*) when I saw a very small wader. Its upper-parts were of an ashy grey colour streaked with darker marks ; the under-parts were white except for a patch on the breast which was grey. The tail, seen both at rest and in flight, had very definite white edges. The legs were greenish and the bill dark. When flushed it flew up steeply calling with a high trilling note which was recognizable even above the clamour of the Redshanks. I watched the bird at intervals over a period of two hours and was able to compare it with some Dunlin (*Calidris alpina*) which were present. It was much smaller than they were and, when compared to the Redshank, it was, at the most, only half the size. I have no doubt that the bird was a Temminck's Stint (*Calidris temminckii*), although the earliest date shown in *The Handbook* is April 16th. The observations were all through x 8 glasses from varying distances, the closest being ten yards.

J. O. OWENS.

COMMON SANDPIPER SINGING ON PASSAGE.

As there is no indication in *The Handbook* of the Common Sandpiper (*Actitis hypoleucos*) singing after June, the following may be of interest. While watching Common Sandpipers at the Guildford Sewage Farm on August 26th, 1948, I saw two of these birds fly up from an irrigation bed and circle widely overhead singing. They flew round at a height of about 30 feet ; the flight was slow and purposeful, and the wings were fully extended and held at a straighter angle than usual. This song continued for at least 15 minutes, after

which I left the immediate vicinity. There were other birds of the same species on the edge of an irrigation bed below, some of which were heard to sing ; although none rose from the ground. The fact that some birds of this species were heard to utter the " breeding-ground " alarm-note in late August may also be of interest.

C. R. BIRD.

[In *Brit. Birds*, Vol. xxxviii, p. 172, Mr. G. C. S. Ingram quotes an observation by myself at Northampton on September 11th, 1943, when two birds were heard " tittering in almost song-like fashion." I have once or twice subsequently heard snatches of song in autumn and occasionally the " breeding-ground " alarm note, as described by Mr. Bird.—B.W.T.]

COMMON SANDPIPER IN WINTER QUARTERS RESPONDING TO FOOD-CALL OF YOUNG PASSERINE.

ON September 19th, 1947, while walking on short grass near Lagos Lagoon, Nigeria, I noticed a fledgling Niger Common Bulbul (*Pycnonotus barbatus nigeriæ*) on the ground calling and posturing for food, whereupon a Common Sandpiper (*Actitis hypoleucos*) came quickly to it and thrust its beak into that of the bulbul as if offering food. I could not see if any food was actually passed. Both presumed parents of the bulbul were in trees overhead. The Common Bulbul is a tree-nesting passerine about the size of a Song-Thrush (*Turdus ericetorum*) and Dr. D. A. Bannerman states that its food consists chiefly of berries, fruit and insects of numerous species.

M. S. MACLAREN.

EARLY TERNS IN BERKSHIRE.

ON the evening of March 29th, 1948, two terns of the genus *Sterna* were present on the Burghfield Road gravel pits, near Reading. The pair was first seen at 5.55, when they were resting on a floating oil drum far away from the observer, but it was not until 7.0 that they were examined through 6 x 30 binoculars at a closer range. For the following half-hour the birds rested on the drum for the most time, now and then rising and flying round the pits fishing in the characteristic tern way. The forked tail was plainly seen when the birds hovered round a Common Gull (*Larus canus*) which attempted to alight on the drum. Other points of recognition observed at rest or in flight were : black forehead, crown and nape, rest of head white ; white under-parts and tail ; grey back and closed wing ; relatively long, narrow bill. Owing to the fading light and distance together with a dark background the distinctions of bill colour, which would determine whether the birds were Common Terns (*Sterna hirundo*) or Arctic Terns (*Sterna macrura*) could not be made out. The birds were presumably Common Terns, which start on their spring passage before the Arctics, but in any case the date is very early for either species.

K. E. L. SIMMONS.

[It seems a safe presumption that the birds were Common Terns rather than Arctic Terns, since for the latter species no earlier date than April 7th appears to be on record, whereas for the Common Tern there are several authentic records for February and March, although such occurrences are quite exceptional.—EDS.]

GULLS DROPPING METAL OBJECTS ON GLASS SKYLIGHTS.

DURING the autumn and winter of 1947-8 some concern was caused at a certain West London factory by the frequent breaking of windows and skylights. The missiles picked up after these incidents were nuts, bolts and various small pieces of scrap iron, usually weighing about 2 oz. "Sabotage" was suspected, and a watch was kept, when the culprits were discovered to be gulls. It appears that a gull would swoop down to the ground, pick up a missile, and then deliberately fly up above the glass roof and drop it on to a pane of glass. I personally interviewed the safety officer of the factory, who informed me that he himself and various other persons employed in the factory had actually witnessed this behaviour on several occasions. The birds were believed to be Black-headed Gulls (*Larus ridibundus*), of which many frequent the buildings and sit in rows upon their roofs, though during a short visit which I paid on March 10th to the scene of the crimes at least one Common Gull (*L. canus*) was also seen. The breakages ceased when the gulls left in the spring.

It seems possible that the birds may have been hopefully treating these indigestible articles as shellfish, which several species of gulls are known to be in the habit of dropping from a height when unable to open them.

H. A. BAYLIS.

QUAIL IN OXFORDSHIRE.

THE Quail (*Coturnix coturnix*) is described in *The Handbook* as "now very scarce". W. B. Alexander in his *Revised List of the Birds of Oxfordshire* (1947) states that "probably a few pairs still breed annually in the county . . . More than usual were present in the summer of 1944, when about a dozen were reported as heard calling in various localities, but in 1945 there was not a single record."

In view of this I was surprised to hear Quail calling frequently during the summer of 1948 (my first in the district) in the fields, mostly corn, round Berrick Salome and to find that the call was regarded by the local farm-workers as nothing unusual. The general view expressed was: "we hear a few every year". With the help of Mr. A. Hoddinott I concluded that at least five and probably six different birds were calling in an area of about $2\frac{1}{2}$ square miles.

Meanwhile, without paying special attention to the subject, Mr. John Ormiston located at least nine different birds calling in an area to the south of mine, between Swyncombe Down and Grims Ditch; and Dr. J. F. Monk another four or possibly five, south again, towards Goring-on-Thames.

There is no doubt that, in a strip of country totalling about nine miles long by $1\frac{1}{4}$ broad on the western foothills of the southern Chilterns, at least 20 different Quail were calling during the summer of 1948. Single birds were seen on several occasions, and once two (Ormiston), but no bevy. The earliest record was June 5th and the latest September 2nd in corn that was being cut.

R. E. MOREAU.

[The tract of country near the foot of the Chilterns has been known for some time past as a good one for Quail, but numbers reported to the Oxford Ornithological Society in any one season have never approached those mentioned by Mr. Moreau. On the other hand it must be borne in mind that such reports have been almost exclusively the results of casual visits from Oxford or other places at a distance, and further systematic investigation in the present and subsequent years would be of considerable interest.—EDS.]

LATE YELLOW WAGTAILS.—With reference to the note on the occurrence of Yellow Wagtails (*Motacilla flava flavissima*) in Sussex in October (*antea*, Vol. xli, p. 251) Mr. Howard Bentham informs us that he saw four birds at Beddington Sewage Farm, Surrey, on October 4th, 1942, and one was observed in the same locality on October 12th, 1946. A single bird was noticed at Colchester, Essex, on October 3rd, 1915. Lt. Col. H. C. B. Rogers has sent particulars of a Yellow Wagtail seen at Penzance, Cornwall, on October 18th, 1948. Major A. W. Boyd adds a further record of one at Witton Flashes, Northwich, Cheshire, on October 8th, 1911.

BLACK-NECKED GREBE IN CUMBERLAND.—Mr. Robert Walker sends us full details of a Black-necked Grebe (*Podiceps nigricollis*), a bird of the year, which was observed by himself and others on Siddick Ponds, near Workington, Cumberland, between August 3rd and 18th, 1948, inclusive. The recorder observes that although it is certain that Black-necked Grebes did not breed at Siddick Ponds, the presence of this immature bird suggests that they may have nested successfully somewhere in the district. This is of course so, but it is also quite possible that it came from a distance, as is undoubtedly often the case with immature birds occurring on other waters. It may be noted that a pair nested in Westmorland in 1935.

FLOCKING OF COMMON SANDPIPER.—Mr. L. Salmon informs us that on April 26th, 1947, he saw a flock of 25 Common Sandpipers (*Actitis hypoleucos*) at Bartley Green Reservoir, Birmingham. The birds formed a compact flock when feeding and resting, but scattered in flight. A spring flock of 20 is recorded in *The Handbook* as "exceptional".

GREATER YELLOWSHANK IN KENT IN 1943.

Correction.—In the note under this heading on p. 158 the rendering of the note should read "wheu-wheu-when", not "whee-whee-whee."

NOTICE TO CONTRIBUTORS

British Birds accepts papers and notes dealing with original observation on the birds of the British Isles and Western Europe or, where appropriate, on birds of this area as observed in other parts on their range. Review articles on subjects of current ornithological interest will also be considered.

Contributors are asked to observe the following points, attention to which saves the waste of much editorial time on trivial alterations. MSS. if not typed should be clearly written. Authors of papers, especially those containing systematic lists, lists of references, tables, etc., should consult previous papers on similar lines in *British Birds* as a guide to general presentation and set-out, including use of particular type, stops, and other conventions, such as date following the month (January 1st, etc., not 1st January), names of books and journals in italics, not inverted commas, and so on. Capital initial letters are to be used for proper names of definite species: thus "Great Tit," but "flocks of tits." [In systematic lists the whole name should be in capitals]. The scientific name (underlined in MS. to indicate italics) follows the English name in brackets without any intervening stop. Scientific nomenclature follows *The Handbook of British Birds* or H. F. Witherby's *Check-List of British Birds* based on this, with the qualification that subspecific names should not be used in connexion with field observations except in cases where subspecies are definitely separable in the field, e.g. Yellow and Blue-headed Wagtails, or where their use is necessary in discussion. When the subspecific name (in cases where this is used) repeats the specific name the initial letter only should be used for the latter; otherwise the whole name should be given in full: thus "*Parus m. major*," but "*Parus major newtoni*."

Notes should be drawn up in as nearly as possible the exact form in which they will be printed, with signature in BLOCK CAPITALS, and the writer's address clearly written **on the same sheet**. If more than one note is submitted each should be **on a separate sheet** with signature and address repeated. Though suitable headings and scientific names can be added by the Editor, if necessary, they should be inserted by authors as far as possible. Communications should always be as concise as possible, though reasonable detail can be given where this is important. Notes or records of subsidiary importance may be abbreviated or otherwise modified by the Editor for inclusion in the section of "Short Notes." Maps or graphs must be **neatly** and **boldly** drawn in Indian ink on good quality white paper or Bristol board, with due allowance for reduction when necessary. Authors without experience of making drawings or diagrams for publication are strongly advised to get the help of a skilled draughtsman. Lettering and figures should be inserted lightly in pencil only.

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SPECIES AND SUBSPECIES: A REVIEW FOR GENERAL ORNITHOLOGISTS.

BY

B. W. TUCKER.

(Concluded from page 174.)

LOCAL AND INDIVIDUAL VARIATION AMONGST BRITISH BIRDS.

WE have now completed our general consideration of the nature of subspecies and species. It remains to consider certain facts and problems which affect the British Isles and British ornithology in particular.

We shall refer first of all to the problem presented by the occurrence in one race of individual variants or aberrations reproducing more or less exactly the characters of another race. We allude here not to the obviously mixed populations in the transitional zone between one race and its neighbour, but to more sporadic occurrences. The most spectacular instance of this phenomenon in the British Isles is the occasional breeding in parts of east and south-east England of "Yellow" Wagtails (*Motacilla flava*) agreeing closely in appearance with the pale-headed West Siberian race or Sykes's Wagtail (*M. f. beema*). Probably no experienced student of the subject now seriously believes that these birds are immigrants from West Siberia; they are variants arising in the West European population, though whether from a population of British Yellow Wagtails (*M. f. flavissima*) or Blue-headed Wagtails (*M. f. flava*) is less clear. The fact that these variant birds with their pale grey heads are more like the Continental *M. f. flava* and have been found breeding almost entirely in the south-eastern part of England, in which birds of that form most frequently nest, would support the view that they are derivatives of *flava*. But this is by no means certain. In spite of the distinct appearance of typical British Yellow Wagtails, it has been shown recently by careful observation (Smith, 1942) that in a region of north-west England, where definitely recognizable (i.e. male) examples of *flava* only occur quite exceptionally, females of the local breeding population show an admixture of individuals with greyish crowns distinctly demarcated from the greenish mantle just as in typical female *flava* and that there is a more or less complete gradation between these and the typical *flavissima* type. It can scarcely be doubted, then, that here an indigenous British population is producing variants amongst the females (though apparently, and rather oddly, not amongst the males) resembling the Continental race and probably the same kind of thing

occurs in other parts of Britain.* These considerations seem to show that the genetical make-up of the Yellow and Blue-headed races, in spite of the striking colour difference in the males, is really very closely similar and if the former can produce "Blue-headed" variants, at any rate in the female sex, the possibility cannot be excluded that the *beema*-like birds are also variants of this race, although the evidence suggesting that they are variants of *flava* is perhaps stronger.

The occurrence of such variants raises the question whether the Blue-headed Wagtails, and also the White Wagtails (*Motacilla a. alba*), recorded as breeding in Great Britain are in fact immigrants from the Continent, as is ordinarily assumed, or whether they are at least sometimes variants of the British races, that is of the Yellow and Pied Wagtails respectively, simulating the Continental forms. As a small number of Blue-headed Wagtails breed with some regularity in south-eastern England the writer sees no reason for supposing that these are not in fact individuals of Continental origin, especially as in some cases the females are recognizably of *flava* type as well as the males.† But it seems quite possible that some at least of the many reported cases of White Wagtails mated with Pies in Great Britain may be due to the occurrence of pale-backed variants in the British stock, a consideration which serves to emphasize the inadvisability of being dogmatic with regard to subspecific determinations of single birds even when the differentiating characters between subspecies are well-marked, as in the wagtails.

The occurrence in populations of one race of individuals of a type which is more or less stabilized as the local geographical form in another more or less distant region is no isolated phenomenon in the Yellow Wagtails of Britain. A proportion of birds with pale grey heads of the *beema* type is known to occur also in Hungary (Kleiner, 1935) and probably elsewhere in Central Europe, while Ticehurst and Whistler (1932) showed that amongst apparently breeding birds of the very well-marked race *M.f. feldegg* (the Black-headed Wagtail) in Albania a proportion of individuals occurs with the characters of the Grey-headed Wagtail (*M.f. thunbergi*), whose normal breeding range is hundreds of miles away in North Europe, together with intermediates. Other examples could be added.

The races of the Yellow Wagtails present some evolutionary problems of great interest and there is reason to believe that they are

* In this connexion it is interesting to note that in 1945 two females with typical *flava* characters were mated with typical male Yellow Wagtails (*flavissima*) on the Oxford Sewage Farm. Blue-headed Wagtails are very uncommon visitors to Oxfordshire and have only been recorded five times in about the last half century, and it seems very unlikely that two females of that race would appear at the same locality in the same year and pair with British males. This possibility cannot, of course, be excluded, but it seems at least as probable that they were variants of the local population, though it must be admitted that no more females of this type have been noticed in subsequent years.

† A similar situation occurs in respect of the Yellow Wagtail on the Continent, birds of this form being found breeding locally in places near the seaboard of Western Europe.

actually in a state of more than ordinary genetical instability, yet it is not impossible that the state of affairs described is so noticeable in the group *partly* because the racial characteristics are so pronounced, whereas in many other species, where the subspecies are very similar, the same kind of thing would tend to be overlooked. Certainly systematists are becoming increasingly aware of a comparable tendency in other species, which may express itself by the sporadic appearance in a given race of variants either resembling the normal type of another race or of a type which in another race or races occurs much more regularly. Rand (1948) in a valuable discussion of "Probability in subspecific identification of single specimens" describes a number of such cases amongst American birds and other examples can be quoted from the British Isles.

In December, 1943, a Starling was shot in Lincolnshire which was reported in *British Birds* (Harrison, 1944) as an example of the Siberian race, *Sturnus vulgaris poltaratskyi*, the main characteristic of which is a purplish gloss on the crown and ear-coverts instead of the greenish gloss which is normal in British birds. Subsequently other examples of what is clearly the same thing have come to light and after a careful examination of the specimens and of extensive British and Continental material the writer is fully convinced that these birds are not Siberian immigrants at all, but represent a variant type of the European population, the existence of which has in fact been recognized for many years. Purple-crowned birds occur more or less commonly in *Sturnus v. vulgaris* in Central Europe (Pateff, 1947) and to a less extent in Sweden. Thus both purple-crowned and green-crowned individuals are found in *S.v. vulgaris* over a considerable part of Continental Europe and in the writer's opinion there can be no reasonable doubt that the purple-crowned birds which occur in Britain are winter visitors from the Continent; there is no good evidence whatever that *S. v. poltaratskyi* ever occurs in Western Europe, although of course there is no inherent impossibility of its doing so occasionally. It should be noted moreover that the definitely purple-crowned birds are linked with the green-crowned type by intermediates with a more or less faint tendency to purple; such birds are not uncommon in this country in winter and occur also in the British breeding population, which, as noted above, is predominantly green-crowned. It is quite possible that even the type with strong purple gloss on the crown may occur occasionally amongst British breeding birds, but this has not been definitely proved up to date.

Another interesting case is that recently recorded in *British Birds* by Jeffery Harrison (1949), who showed that the spotting of the breast which is a normal character of the drake Greenland Mallard (*Anas platyrhynchos boschas*) occurs occasionally in English birds and in fact that the frequency of this character forms a cline with the incidence highest in Greenland and Iceland and falling off eastwards and westwards. Again, attention was recently drawn in the *Reports of the Cornwall Bird Watching and Preservation Society* (1947 and 1948)

to the presence in a Cornish breeding colony of British Lesser Black-backed Gulls (*Larus fuscus graellsii*) of a number of individuals with such dark mantles that they resembled the Scandinavian race (*L. f. fuscus*). The recorder, in fact, at first supposed that they actually belonged to this form, but it is quite beyond belief that they were really birds of Scandinavian origin; they clearly represented a variant of the British population which has not hitherto been recognized.

We have so far in this section been mainly concerned with cases of rather exceptional and sporadic variation, but these grade into a less restricted type of non-uniformity which is found in a number of British races. In actual fact no race or part of a species is really uniform in its constitution, for a notable result of modern genetical researches is to make clear that by appropriate methods any local population can be shown to be different in its precise hereditary make-up from any other, although such differences may be only detectable by highly specialized techniques. What is referred to here is not such excessively minute and intangible variation, but visible differences of a clearly recognizable kind. The existence of such local differences in populations of certain British birds has been recognized for a long time. For example in the Irish race of the Coal-Tit (*Parus ater hibernicus*), in which typically the cheeks, nape patch and underparts are more tinged with yellow than in the British form (*P. a. britannicus*), some individuals, especially in the north-east of Ireland, are indistinguishable from the latter race, while birds showing a more or less marked approach to the Irish form occur in parts of South Wales. In recent years, however, it has been shown that this kind of situation is more frequent than used to be supposed. Thus, in the south-east of England, in Kent, many of the Robins are more or less intermediate between the British race, *Erithacus rubecula melophilus*, and the Continental form, *E. r. rubecula*, some being scarcely if at all distinguishable from the latter in breast colour, though the back is usually more olive (Harrison, 1942, Lack, 1946). Conversely, in Western Holland birds showing a more or less close approach to the British form are found amongst the breeding population, although others are stated to agree perfectly with typical Continental examples from farther east. Similarly intermediate birds are described from Brittany. A closely similar situation has been shown to exist in the Jays (Harrison, 1945), where some breeding birds in south-eastern England are actually inseparable from the Continental form, *Garrulus g. glandarius*, while others are intermediate between this and typical examples of the British race, *G. g. rufitergum*; birds from Holland form a similarly mixed population, though here the majority are nearest *G. g. glandarius*, as would be expected. A more or less distinct tendency towards the Continental type has been observed in south-eastern populations of some other British birds.

In all these cases the ranges of an insular race and the race of the adjacent mainland are not sharply delimited by the sea, as might have been expected. This is a state of affairs of considerable biological

interest and in some ways a rather puzzling one. It would seem reasonable to interpret it as indicating that although the isolation of the insular stocks has been sufficient to permit racial differentiation there is nevertheless sufficient interchange across the sea to account for the intermediate populations referred to. In other words it would seem to imply that birds crossing the sea-barrier in either direction as migrants do not necessarily return to their homeland, but may remain to breed in adjacent parts of the territory of the other race in sufficient numbers to influence the visible characters of the population. In the case of such species as the Robin the known facts about the migrations of the two races are not inconsistent with this view, though it would be interesting if ringing on a sufficient scale could confirm it. But in the case of the Jay the British race is supposed not to emigrate. Yet we have seen that some birds in Holland, at any rate, approach the British form.

Such cases raise the question whether intermediate populations on the two sides of the Channel are really—or are always—due to actual interchange of breeding birds or whether the Channel merely introduces an obvious physical discontinuity in what would in any case be a transitional zone between two races which owe their differentiation less to this obvious barrier than to other environmental influences. The latter alternative seems in some respects rather improbable, yet it receives some support from the case of the Song-Thrush. Here the boundary between the so-called British and the Continental race (*T. e. ericetorum* and *T. e. philomelus*) is quite definitely not the Channel at all. The breeding birds of West France, Holland and Belgium are *ericetorum* and the transitional zone between *ericetorum* and *philomelus* runs, according to Meinertzhagen (1947), through West Central Europe.

The case of the Hedge-Sparrows of North Britain has some analogy with that of the Song-Thrushes. Hedge-Sparrows from the north of Scotland are in the writer's opinion racially identical with the Hebridean form, *Prunella modularis hebridium*,* and they intergrade with the so-called British race (*P. m. occidentalis*) farther south in Scotland. Here again the racial boundary is not the sea.

It is evident that in such cases we have a good deal yet to learn about the probable history and present maintenance of such differences. The same is true of a number of other fine local variations which have been detected in Britain in recent years. The Greenfinch (*Chloris chloris*) will afford an example of these. Greenfinches from south-western Scotland tend to be slightly darker above and distinctly darker below than birds from north-western Europe as typified by

* The claim that the north Scottish birds should be recognized as a distinct race (Clancey, 1943) is quite indefensible. Col. Meinertzhagen (1947) in discussing this alleged race states that the birds are "pure intermediates between *P. m. occidentalis* and *P. m. hebridium*". But he refers to birds from west, mid- and south Scotland, which I agree are intermediate, whereas north Scottish birds appear to me inseparable by any valid character from *hebridium*, as stated above.

Swedish specimens. These Scottish birds have recently been named *Chloris chloris harrisoni* Clancey. Such a race, unlike most of those described by that author, is reasonably defensible. Pending further study the writer prefers to reserve judgment as to the desirability of recognizing even this as a named form, but the name will be used here for descriptive purposes, while the term *Chloris ch. chloris* (or *chloris* for short), which, as at present generally accepted, covers British as well as Continental birds, will be restricted to the latter. In most of England, and in east Scotland according to Meinertzhagen (1947), there is found an essentially intermediate population between "*harrisoni*" and *chloris*, with a strong leaning to the *chloris* type in East Anglia and with some individuals even outside that area indistinguishable from that form. In Cornwall, however, markedly yellow-breasted birds occur, which approach the Iberian and North-west African race *aurantiiventris*, while in the north of Scotland the birds are stated again to make a close approach to *chloris*. Here we have even in the limited area of Great Britain a distinctly complex situation, and a comparable state of affairs, though for the most part involving even slighter differences, has been described in other species. Such local complexities are of course by no means peculiar to the British Isles and in America have been the subject of such an outstanding treatment as A. H. Miller's *Study of speciation in the avian genus Junco* (1941), which utilizes all the apparatus of modern systematic techniques, including a proper statistical evaluation of the differences described. Unfortunately in this country the realization of such differences in recent years has led to little more than an indefensible multiplication of trinomial names based upon alleged distinctions so utterly trivial and inconstant (when they exist at all), and promulgated with such complete disregard of modern research methods, that unless stopped the practice is likely to do real injury to the systematic study of British birds.

It is not part of the object of the present paper to examine in detail the absurd situation that is being created by the irresponsible misuse of the trinomial system. The writer has already published some remarks on the subject in the *Bulletin of the British Ornithologists' Club* (1946). It will suffice to recall the point made on an earlier page that *any local population can be shown to be genetically different from any other*, provided only that the technique of analysis is sufficiently delicate and precise. The excuse that any demonstrable difference, however intangible and inconstant, must be pinned down by the introduction of a trinomial name is thus completely invalid, for in theory the practice of naming ever smaller and smaller and less clearly isolated units could go on almost *ad infinitum* and, to quote Mayr again, "not even the most extreme splitting will ever lead to completely homogeneous categories." Any system of nomenclature inevitably "represents the facts as simpler than they are", but handled with judgment the trinomial system provides a reasonable approximation to the facts, whereas exaggerated splitting positively

misrepresents them by implying a whole series of discontinuities where none exists. There will be differences of opinion even among systematists of experience and sound judgment as to exactly where the line should be drawn in attributing subspecific status to fine local forms, but it is quite certain that this line has been far exceeded in many of the alleged forms that have recently been named. In short the natural impulse of the average ornithologist to revolt against such hair-splitting is fundamentally sound and right.

So excellent an ornithologist as Mayr has recently stated that in "Palæarctic . . . birds, even most of the 'good' subspecies are already described" and at least with regard to Western Europe the present writer heartily concurs. The finest local variations cannot be described in terms of named subspecies without doing violence to the facts of nature. Such fine variations deserve the attention of qualified biologists, but they call for a quite different and much more skilled technique of investigation than the rule-of-thumb matching or differentiation of fine shades of colour after the fashion of a milliner's assistant. Far from the facts demanding the recognition of many new subspecies in the British Isles, there is reason to believe that some subspecies which have long been accepted would have been better not separated and it is somewhat startling to find that two supposed British races described by Hartert and accepted by such a cautious and critical systematist as H. F. Witherby have probably no real existence. Yet Col. Meinertzhagen (1947), a most experienced worker and certainly not unfavourably disposed to somewhat fine subspecies, has recently stated that comparison of a large series of Nuthatches shows that there is no real difference between the Continental *Sitta europæa cæsia* and British birds, which have been accepted for many years as constituting a valid race, *S. e. affinis*, while the differences between British and Continental Goldcrests are "so slight and often utterly lacking" that *Regulus r. anglorum* should probably not be admitted. In all probability both these supposed British races will have to be suppressed.

At the opposite extreme to the unimaginative multipliers of mere names, a few of the more acute systematists and biologists interested in systematics are even beginning to voice misgivings as to whether the trinomial system is not beginning to break down as an effective method of representing geographical variation. As an example of this an instructive discussion by Lack (1946) on the taxonomy of the Robin may be mentioned. Robins in the western Canary Islands, the Azores and Madeira are indistinguishable from typical Continental *Erithacus r. rubecula* (and so have to be given the same subspecific name), though the two populations are separated from one another by a differently coloured population in the Iberian peninsula, while Tunisian birds are like the British form in plumage, though isolated from the latter by a great distance and by an intervening population of a different colour, to which in terms of actual blood relationship they must be more closely allied. Clearly such a situation cannot be

represented in a really satisfactory manner by the use of trinomial names, which, as Lack observes, "not only implies discontinuity where none may exist, but also unity where there may, in fact, be discontinuity". Having considered these and other difficulties he concludes: "One therefore begins to wonder whether subspecific trinomial terminology is not beginning to outlive its usefulness and validity. Certainly in the case of *Erithacus rubecula*, it is both simpler and more accurate to describe subspecific variation in terms of geographical trends and to omit altogether the tyranny of subspecific names."

Probably most even of the more biologically-minded systematists at the present time would consider this a somewhat extreme view. Admitting the frequent difficulty of naming subspecies satisfactorily when a species has been collected from many localities instead of a few only, as well as the other type of difficulty illustrated above, they would still maintain that the trinomial system has justified itself as the most practical method of expressing the facts of geographical variation, even though not perfect, and that it is not incapable of adjustments to make it do so better.* This more "orthodox" view certainly holds the field at present and is unlikely to lose it in any practically foreseeable future. Yet the alternative view quoted above has undeniable force and he would be a bold prophet who would assert categorically that with increase of knowledge it may not gradually prevail. At any rate it represents an incomparably more healthy and realistic reaction to the facts of the situation than the misleading and sterile multiplication of names with which we have recently been afflicted in this country. It would be out of place to elaborate the subject further here, but enough has been said to show that the important evolutionary concept of the subspecies is itself undergoing a process of evolution and at the present time is in something of a state of flux. Non-systematists would do well to recognize this and not to imagine that the last word has been said on the subject.

SUBSPECIES AND FIELD ORNITHOLOGY.

Though the primary object of this review has been to provide an up-to-date presentation of the subject of species and subspecies in ornithology in terms intelligible to the layman, the writing of it was stimulated in the first instance by the need for making clear to field workers the real significance of trinomial names and their limitations in relation to field ornithology. It remains, in conclusion, to discuss this last-named aspect of the subject.

It was stressed at the outset that subspecies are for the most part much less objective and clear-cut in their characters than species and that this is the case should have been made obvious by the whole of the subsequent discussion. This fact has been obscured for the

* Huxley's valuable concept of clines (p. 133) as an adjunct to trinomial nomenclature and the increasing recognition of intermediate populations of inconstant characters, which it is misleading to force into the straight-jacket of a subspecific name, are steps in this direction.

majority of amateur ornithologists by the practice of giving English names to subspecies, such as British Blue Tit, Continental Blue Tit and so on. The practice was justifiable in order to stress the importance of subspecies in ornithological systematics at a time when trinomial nomenclature had not yet gained general recognition in this country; but in the long run its results have been unfortunate and the writer has no doubt that it should now be discontinued.* It has led to a widespread impression amongst amateur ornithologists that subspecies are much more definite and clear-cut entities than in fact they are. It leads many people to suppose that subspecies are of comparable importance to species, and indeed to make no clear distinction between them, as is evidenced by the comparative frequency with which in the writings of quite good and experienced field ornithologists forms which are in fact subspecies are referred to as species. This use of vernacular names for subspecies and the fact that trinomial names have until recently been generally used in this journal, as they still are in much field literature, has given subspecies an altogether inflated importance in the eyes of many field workers and has fostered an impression that a field record is somehow less valuable and less "scientific" if it has not a trinomial name tacked on to it. In actual fact the reverse is frequently the case. The practice of distinguishing and naming subspecies was developed to facilitate the intensive study of geographical variation, which is the task of museum workers, and the vast majority of subspecies cannot possibly be distinguished in the field by even the most skilled observers. In the majority of cases, therefore, the attachment of a trinomial name to a field observation is either at worst a mere guess or at best a pure assumption based on geographical considerations and adds nothing to the value of the record. A Blue Tit is a Blue Tit whether it is a Continental or a British bird and its essential attributes, as they concern the field worker, are the same in either case.† In many cases the attachment of a British subspecies name to an observation made in Britain may be actually erroneous, because, unless it concerns a definitely breeding bird, the bird referred to might have been a Continental immigrant. This consideration can be met by saying that trinomial names should only be used with reference to breeding birds if another race, or races, is known to occur in the country as a visitor and that in such cases only a binomial name should be used with reference to observations made outside the breeding season. This was in fact the line taken by so careful and excellent an ornithologist as the late H. F. Witherby and no very serious objection can be taken to it. On the other hand the writer would point out that the use of trinomials

* It is recommended that when it is necessary to use an English designation for a subspecies at all such an expression as "British race (or subspecies) of the Blue Tit" or "Blue Tit (British race)" should be employed.

† There are of course often geographical differences in habits, behaviour, voice and so forth within a species, but these may or may not coincide with subspecific differences and frequently do not do so.

even in such cases really adds nothing to the value and precision of the record. The student of geographical variation in habits, behaviour or other points is entitled to assume that an observation on a breeding bird in Britain refers to the British race whether a trinomial is attached to the record or not, but the use of the trinomial in ordinary field recording only deflects attention from the fact that it is the *species* which is of primary importance, while the subspecies is something quite subsidiary and more often than not irrelevant from the field point of view. The facts outlined in the last section with regard to variation within the subspecies reinforce the view now held by many of the most experienced ornithologists that subspecific names are better discarded altogether in relation to field observations except where the subspecies is positively identifiable in the field. A bird of a "British" race may be indistinguishable even in the hand from one of the "Continental" race if it comes from south-east England, a "British" Coal-Tit may look like an Irish one and vice versa, or again, as in the Song-Thrush, a bird with "British" characteristics may nevertheless be an immigrant from the Continent. Again it may be recalled that the races to which—following the standard works—British Nuthatches and Goldcrests have been assigned for years in scores of field publications have probably no real existence at all. We come, then, to the conclusion foreshadowed already that trinomial names are primarily the province of museum workers and are better not used in field ornithology except with reference to the small number of races which are really identifiable in the field. Such cases remain to be discussed.

There is in fact a small number of races, such as the various forms of Yellow Wagtail, or rather the males of these forms, whose characters are so well marked that they are definitely recognizable in the field by sufficiently experienced observers under good conditions. But it should not be overlooked that even here a faint element of uncertainty exists because of the fact noted in the last section of the occasional occurrence in populations of one race of variants resembling another race. A bird with the characters of, say, the Grey-headed Wagtail (*Motacilla flava thunbergi*) of Scandinavia occurring in this country might just possibly be a variant of the Blue-headed or some other race. But in the case of a race such as this, which would be expected on general geographical grounds to occur occasionally, it would be unnecessary pedantry to reject a carefully documented record because of this remote possibility, which it will be realized applies equally to a specimen which has been collected. Such identifications by maximum probability are habitually and quite legitimately made in ornithology, even at times by museum workers, as Rand (*l.c.*) has pertinently pointed out. For example no one would think of rejecting records of the common and familiar Tree-Creeper in this country because the Short-toed Creeper, which occurs just across the Channel, is so nearly identical, for the very good reason that of a great many Tree-Creepers collected in Britain not a single

specimen has ever proved to be *Certhia brachydactyla*, although its occurrence here is quite possible. Nor would the most exacting critic insist on qualifying all records referring to female Teal (*Anas c. crecca*) because the female American Green-winged Teal (*A. crecca carolinensis*), which has occurred here on a few occasions, is virtually indistinguishable. Commonsense is necessary in field identification as in other matters, and the same principle can be applied in identifying well-marked races. Nevertheless it will be worth while to mention one or two actual cases where more than ordinary caution is needed because they emphasize difficulties with regard to racial identifications which field workers are apt to overlook.

The Greenland race of the Wheatear (*Enanthe æ. leucorrhoa*) is a rather well-marked form which passes through Britain regularly on passage and is constantly recorded in county reports, though the more cautious editors usually place the records in square brackets as "probable" rather than quite certain. In this connexion the writer has heard good and experienced field workers, who nevertheless have probably never examined skins, protest that "of course" they can always recognize Greenland Wheatears, that the characters are "quite distinctive once you know them", etc., etc. Now it is quite true that the Greenland Wheatear tends to be browner above and more strongly buff below than the European race, in addition to being somewhat larger and inclining to a more upright stance. But many individuals, especially females in autumn, are quite indistinguishable from European Wheatears and the differences of stance and behaviour are a matter of tendencies, not absolute distinctions. Moreover the Wheatears of Iceland and the Faeroes are somewhat intermediate between typical Greenland and European birds. Thus in the field there is virtual intergradation between the two races, and although the more strongly characterized male Greenlanders can be recognized with fair certainty by qualified observers acquainted with the range of variation in the common form, others would certainly pass for European Wheatears in the field and it is quite impossible to draw any sharp dividing line.

Various other examples could be quoted, but one more must suffice, involving the occasional approach of individuals of one race to the average of another which was discussed in the last section. Cormorants (*Phalacrocorax carbo*) at the beginning of the breeding season develop more or less conspicuous white on the head, due to fine hair-like feathers which protrude amongst the ordinary feathers. This white on the head is on the average much more strongly developed in the race occurring over most of Continental Europe, the so-called Southern Cormorant (*P. c. sinensis*), than in the race breeding in the British Isles and Northern Europe (*P. c. carbo*). In recent years the writer has received a number of reports of Southern Cormorants in Britain based on unusually white-headed birds. In eastern and south-eastern England there is good reason to suppose that such birds are *sinensis*, which would be expected to visit us from time to

time across the Channel and has been proved to do so by collected specimens, which are identifiable by a greenish instead of a blue gloss to the plumage which is not visible in the field. But some notably white-headed birds have been reported from the west, where *sinensis* is less likely to occur, and even in breeding colonies of *carbo*. In fact observers have been misled by paying too much attention to the plates in *The Handbook* (which show more or less average conditions in the two races and not the extremes of variation) and not enough to the text, into supposing that any strongly white-headed birds are *sinensis*, which is not the case. When Mr. Witherby was investigating the characters of the races he found no evidence that individuals of *carbo* ever attain such a strongly white head as *sinensis* commonly does, and so far as the writer has been able to ascertain no proof to that effect is even now forthcoming,* but undoubtedly occasional individuals of the British-breeding race become white enough to cause confusion in the field and once again the need for caution is emphasized.

The writer ventures to hope that this exposition of some of the pitfalls in the field identification of even strongly marked subspecies—and it will bear repeating that no others can possibly be distinguished in the field at all—may help to inculcate a wider appreciation of these difficulties amongst field workers.

ACKNOWLEDGMENTS.

No zoologist writing on the present topic could fail to be deeply indebted to Ernst Mayr's *Systematics and the Origin of Species* and Julian Huxley's *Evolution: The Modern Synthesis*. The writer would also wish to acknowledge his debt to the Zoology Department at Oxford, where stimulating contacts with colleagues and students over a number of years have undoubtedly influenced his views and outlook in ways which may be difficult to analyse but are not the less important. Published papers expressly referred to in the text are listed below.

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* As Cormorants are rather large birds, taking up much room in museum cabinets, and not usually considered of particular interest, and as the full development of the white on the head is extremely transitory owing to the rapid wear of the hair-like white feathers, it is difficult to be sure that the limited numbers available in museums really cover the extremes of variation in this character. The subject is still receiving attention and a more detailed communication will be published in due course.

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REPORT OF THE BLACK REDSTART INQUIRY FOR 1948.

BY

R. S. R. FITTER.

JUDGED by the total number of pairs known to have bred, 1948 was the best year the Black Redstart (*Phœnicurus ochrurus*) has had in England yet, and the bird was also more widespread in the breeding season than in any year since 1943. At least twenty-six, and probably twenty-nine, pairs are known to have bred, and some fourteen other singing males were present in the breeding season. The marked tendency for small breeding populations to become established in a few localities is interesting. In the City of London, for instance, and at Dover, Hastings and Pett Level, 1948 was at least the sixth successive year in which either one or more pairs had bred or one or more singing males had been present. Yet the populations at one time established at Wembley, Cambridge and Lowestoft, for instance, have died out.

A notable feature of 1948 was the number of localities where birds were reported in July and August, well before the normal arrival date of Continental immigrants, which is from mid-September in small numbers with the main body arriving in October and November. Such post-breeding-season wanderers were seen at Eastbourne (Sussex) in July, and at Swanage (Dorset), Crawley (Sussex), Elmley Ferry (Kent), and Blakeney Point (Norfolk) in August.

A summary of the breeding-season records in 1948 follows:

V.C.14 EAST SUSSEX.

Hastings and St Leonards, three pairs nested (H. G. Attlee, B. T. Brooker, N. F. Ticehurst, R. N. Ticehurst, A. A. Wright, and others); at least seven other singing males present. Pett Level, three pairs nested (R. Cooke, A. Denby Wilkinson).

V.C.15 EAST KENT.

Dover, eleven pairs nested (G. E. Took). St Margaret's Bay, a pair stayed several weeks in the spring, but did not breed (G. E. Took). Gillingham, one in a disused cement works in June and July (G. B. Rimes). Rochester, one on the Cathedral in June (D. C. Pegram).

V.C.16 WEST KENT.

Snodland, a pair present in June probably nested in a disused cement works (C. M. Knight).

V.C.17 SURREY.

Guildford, a male on August 2nd and two females or juveniles on August 8th and 9th, on a wooded slope running down to an area covered with brick and other rubble (G. A. Hebditch and others).

V.C.21 MIDDLESEX.

City of London, seven or eight pairs nested; Westminster, one pair nested (London Natural History Society, *per* P. W. E. Currie).

V.C.25 EAST SUFFOLK.

Brantham, one pair nested on industrial premises (Miss M. Turner, *per* E. A. R. Ennion).

V.C.28 WEST NORFOLK.

Burnham Overy, a male present in early June (A. E. E. Chambers)

V.C.34 WEST GLOUCESTERSHIRE.

Bristol, one singing in Victoria and Wine Street areas on various dates from April 16th to the third week in June (A. E. Billett, R. H. Poulding, R. D. Purchon); one heard in Castle Street as late as October 5th may have been the same bird (R. H. Poulding).

V.C.38 WARWICKSHIRE.

Birmingham, a male singing in centre of city between May 6th and July 1st (C. A. Norris).

V.C.41 GLAMORGAN.

Cardiff, one singing in centre of city between June 26th and July 1st (Bruce Campbell).

The organizer wishes to thank all observers who co-operated in the Inquiry in 1948, and hopes that they will continue to send information of all Black Redstarts seen in the British Isles during 1949 to him at Greyhounds, Burford, Oxford.

STUDIES OF SOME SPECIES RARELY PHOTOGRAPHED. XXI. THE GREAT SNIPE.

Photographed by OLOF SWANBERG.

WITH PHOTOGRAPHS OF THE COMMON SNIPE BY ARTHUR CHRISTIANSEN FOR
COMPARISON.

(Plates 33—37.)

MR. SWANBERG'S photographs of the Great Snipe (*Capella media*) were taken in 1936 in a valley of Swedish Lapland covered with willow-scrub at 750 metres above sea-level. We are very glad to publish at the same time, partly for comparison and partly on account of their intrinsic excellence, two photographs of Common Snipe (*C. gallinago*) taken in Denmark by Mr. Arthur Christiansen.

Mr. Swanberg's photographs show the somewhat less boldly marked head of the Great Snipe, as compared with the common species, and the more barred appearance of the coverts, due to the more prominent white or whitish tips. The more boldly barred flanks, another point of difference from the Common Snipe, are concealed in the sitting bird.

The Great Snipe occurs as an uncommon passage migrant in autumn in the British Isles and exceptionally in winter and spring. It breeds in Northern Europe and across Siberia as far east as the Yenisei, as well as locally in Central Asia.

B. W. T.

TWO UNUSUAL NIGHTJAR PHOTOGRAPHS.

Photographed by ERIC HOSKING.

We publish on Plate 38 two unusual photographs of Nightjars (*Caprimulgus europæus*) at the nest, taken by Mr. Hosking, one showing the parent in the act of bringing food to the young and the other of the sitting bird yawning, displaying the astonishing gape of this species.



GREAT SNIPE (*Capella media*).

NEST AND EGGS, SWEDISH LAPLAND, July 7th, 1936.

(Photographed by Olof Swanberg.)



GREAT SNIPE (*Capella media*) ON NEST.
SWEDISH LAPLAND, JULY 9th, 1936.
(Photographed by Olof Swanberg.)



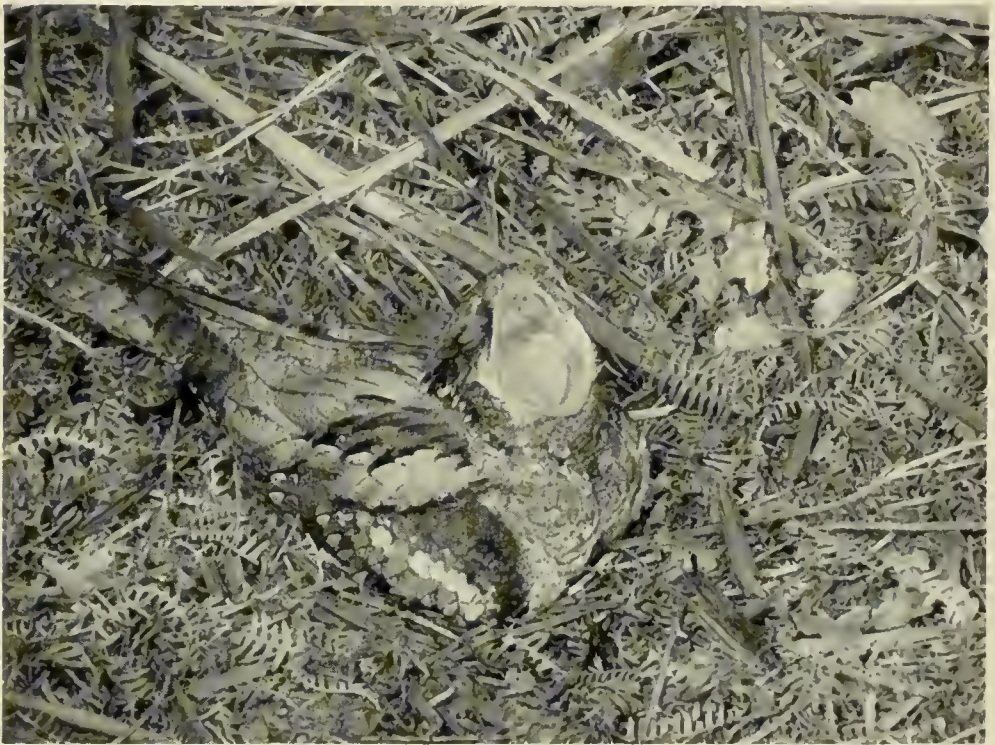
GREAT SNIPE (*Capella media*) ON NEST.
SWEDISH LAPLAND, JULY 9th, 1936.
(Photographed by Olof Swanberg.)



COMMON SNIPE (*Capella gallinago*).
(Photographed by Arthur Christiansen.)



COMMON SNIPE (*Capella gallinago*).
(Photographed by Arthur Christiansen.)



UPPER.—NIGHTJAR FEEDING YOUNG.

LOWER.—NIGHTJAR YAWNING.

(Photographed by Eric Hosking.)

NOTES ON SEXUAL AND TERRITORIAL BEHAVIOUR IN THE COOT AND ON THE INCIDENCE OF NON-BREEDING IN THIS SPECIES.

BY

E. O. HÖHN.

THE observations here recorded were made casually while watching Coot (*Fulica atra*) as well as other water-fowl, but I feel that they may usefully supplement the observations derived from more systematic studies recently published by S. Cramp and Messrs. R. Alley and H. Boyd (*antea*, Vol. xl, pp. 194-203).

Mating Behaviour. Coition and its preludes were observed on the following occasions, April 11th, 1938—twice; March 15th, 1943, both at Mill Pond in N. Staffs., and on May 12th, 1945, at a Middlesex gravel pit. In all cases it took place on "land." The following represents a generalized account, giving the essentials of these four observations. Both birds swam with the neck extended and the head tilted up at an angle, giving a crooked appearance to the neck. The plumage is held as in the common aggressive pose; this is obviously the posture quoted from Boase in *The Handbook*. On reaching land both birds walked stiffly, one behind the other, both holding the body very erect, but with the neck bent down and the head at an angle to the neck pointing forward. A very high pitched call is uttered (? whether by both birds). The (presumed) female then crouches and the other bird mounts, not pecking the female's head as in ducks but fluttering its wings to maintain balance. The birds then separate without any obvious post-coital ceremony; on one occasion the female preened immediately after mating, the male walked on feeding.

The initial posture of sexual display, which must be regarded as epigamic, is not very different from the aggressive posture and I feel that this should be borne in mind when apparently sexual behaviour is reported in this species in autumn or winter.

Territorial Behaviour. Like S. Cramp, I have found territorial aggressiveness shown not infrequently towards other species, e.g., both adults and young of various species of duck, including the Common Pochard (*Aythya ferina*), Moorhen (*Gallinula chloropus*), and Little Grebe (*Podiceps ruficollis*) (Haymill Pond, Bucks., 1935 and 1936). The following observations illustrate the considerable fluctuations in the intensity of territorial aggressiveness and the extreme unsuitability of territories early in the season. These fluctuations were apparently due to the influence of climatic factors on the internal, physiological, state of the birds involved.

On January 10th, 1937, at a mill pond in Bucks., the water front of two large reed beds on opposite sides of the main (southern) portion of the pond were clearly claimed, each by a single Coot. The individuals concerned may be called "A" and "B" for convenience. "B" made frequent attempts to feed at one end of "A's"

territory and was always driven away by the latter. A third Coot, "C," which had apparently, as yet, not acquired a territory, was driven by "B" from the latter's territory into "A's," when both were expelled by "A." On January 23rd, the territory of "A" was held by a pair and one half of it had been ceded to a new pair. The territory of "C" was at times occupied by three birds at a time, yet no hostilities took place.

The weather was mild throughout January but more severe (some falls of snow occurred) in February, and only one Coot was seen in the portion of the pond involved above, while three others peacefully occupied the more northern portions of the pond. The acquisition of definite breeding territories did not begin until March, during which month the Coot population rose considerably.

Both members of a pair frequently took part in territorial warfare. I have frequently observed fights, which I believe were of a territorial nature and in which two birds, side by side, fought two opponents. On these occasions all the birds lay practically on their backs in the water fighting with both feet. An illustrative observation was made on May 22nd, 1937, at Great Meadow Pond, Berkshire: two birds were fighting one another in this manner; one received the support of a third bird while, later, a fourth came to the support of the other of the two original combatants.

Non-breeding Populations. These are, in my experience, frequent e.g., in 1944 about 50 Coots were present throughout the breeding season at Feltham gravel pits (Middlesex) yet none had young by July 8th. At Slough Sewage Farm on June 14th, 1936, there were about 50 Coots without a single young and these 50 must, therefore, have been very largely non-breeders. A similar state of affairs exists annually on the reservoirs of the London area.

Feeding on Frogs. *The Handbook* mentions small frogs among the food of the Coot; the following observations suggest that during the spawning period many frogs are taken.

April 14th, 1945, Great Meadow Pond, Berkshire: The remains of four frogs were found in an otherwise empty Coot's nest. Four Coots were the nearest birds to the nest. On the same day a Coot at Virginia Water was seen to leave the shore with great reluctance on being approached and making obvious attempts to return. Careful search failed to find a nest; instead another dead frog was found.

NOTES.

CARRION-CROW DISTRACTING AND ATTACKING
SQUIRREL.

ON April 15th, 1948, a Carrion-Crow (*Corvus corone*) was seen to attack and drive off a Heron (*Ardea cinerea*) when it flew towards the former's nest in a tall poplar overhanging Crichel Lake, Dorset. Shortly afterwards, I noticed the crow (presumed male) crouched in a curious posture and hopping from branch to branch a little way below the nest, while its mate perched motionless near the top of the tree. The cause of this display became apparent when a Grey Squirrel (*Sciurus carolinensis*) was seen descending the trunk from near the nest. At this moment the crow was below and partly turned away from the squirrel, giving the definite impression that its behaviour was a form of distraction display, in function at least. Certainly, with its feathers puffed out to form a sort of ruff and with wings partly spread, it looked most abnormal both in posture and movement, an object likely to attract the attention of man or rodent.

When the squirrel reached an unprotected part of the trunk, it was sent scuttling to the shelter of some lower branches by a vicious diving attack launched on it by the displaying crow; whereupon the crow, now again below the squirrel, resumed its display until the latter had descended far enough once more to expose itself to attack. This process continued for several minutes during which the crow alternately drove and apparently decoyed the squirrel down the nest-tree and across several others which led to a small wood, into which it was driven by a final diving attack. The presumed female crow flew quietly away when the squirrel was about half-way down, but had by now returned to the top of the tree, while its mate took up a vantage-point below the nest, watching intently in the direction in which the squirrel had disappeared. Soon afterwards the presumed hen slipped quickly on to the nest to brood, leaving her mate still on guard.

Subsequent reflection suggests that there may have been a transition phase of true aggressive posturing between the "distraction display" and active attacks, though I did not clearly distinguish it. It seems probable that the posturing was aggressive in origin and pattern, an alternative to actual attack, even when performed out of context, ahead of and away from the squirrel, when it *functioned* so effectively as a distraction display. If one may attempt an interpretation, admittedly speculative, the crow, already roused by the Heron, expressed his intense anger at the intrusion of the squirrel in typically male fashion by direct attack whenever possible. When outlet of emotion in attack was suppressed by force of circumstances, it was expressed in abnormal posture and movement effective either in "distracting" or frightening the squirrel, depending on the relative positions of the two and the direction in which the

crow faced. What was so remarkable was the expression of thwarted aggression as a functional distraction display of obvious survival value, yet allowing for reversion to actual attack whenever convenient. These observations may prove relevant to the problem of derivation of some more highly developed distraction displays in other species.

K. B. ROOKE.

AUTUMN DISPLAY OF STARLING.

ON October 3rd, 1948, at Highclere, N. Hampshire, two Starlings (*Sturnus vulgaris*) were seen perched on the apex of a roof. They were fairly close together, facing one another, and both were calling typical whistles and clicks. First both birds raised their wings slightly and jerked them over their backs, one bird advancing towards the other, which retreated along the roof; this was continued for some minutes, after which the birds changed rôles. Then one of the birds took up a peculiar erect posture and rapidly flicked its wings, (not vibrated as is common in passerine display), meanwhile shuffling towards the other bird, which pecked at the roof. The display lasted for about five minutes during which time the birds remained about six to twelve inches apart. No reference is given to autumn display of the species in *The Handbook* and this form of display is not recorded, though it is somewhat similar to that given in the Additions and Corrections.

D. & M. SUMMERS-SMITH.

GREENFINCH TAKING SEEDS FROM PINE CONES.

WITH reference to Mr. Boase's note (*antea*, Vol. xli, p. 342) on Greenfinches (*Chloris chloris*) feeding on Larch cones, I have watched single Greenfinches, in my garden, feeding voraciously on the seeds of large, ripe cones of Insignis Pines fallen to the ground. I have not observed these seeds extracted from cones standing on the trees.

Chaffinches (*Fringilla cœlebs*) also are very partial to the seeds of Insignis cones, which they frequently catch in the air as they flutter to the ground from the trees.

B. H. RYVES.

ALTERNATIVE CALL OF CHAFFINCH.

A FURTHER note on the alternative call of the Chaffinch (*Fringilla cœlebs*) may be of interest (*vide antea*, p. 55 and Vol. xl, p. 248, and Vol. xli, p. 273). Before living in Ruislip I had never heard this call, but for 13 years have heard it commonly each spring in Park Wood, Ruislip, Middlesex. Others have remarked on the call there; it is an important component of the bird-sound in April, especially in early morning (between 6.0 and 7.0 a.m.). This wood is composed of oak and birch with hornbeam and bracken below. Conifers are quite absent. I have heard the note rarely elsewhere, but can find notes only for the New Forest, ten years ago.

W. R. PHILIPSON.

SNOW-BUNTING IN STAFFORDSHIRE.

ON December 11th, 1948, I identified an adult female Snow-Bunting (*Plectrophenax nivalis*) at Cannock Chase reservoir, Staffs. The bird was very tame and allowed me to approach within 3-4 yards and I was able to take notes on its plumage, with x 8 binoculars, at this range. I considered it worth reporting as its presence in an inland county and at the above date seems exceptional.

J. SPALDING.

DISPLAY OF TREE SPARROW.

IN "Notes on the Tree-Sparrow" (*Passer montanus*) (*antea*, Vol. xxv, p. 279) I referred to the only instance of the display of the bird I had then observed: a pair, one of which bowed repeatedly, ran along a bough with tail erect and bills pointed straight out as if to show the throat. *The Handbook* quotes a note from Miss E. L. Turner who saw a similar display of a bird, which also expanded and vibrated its wings, raised and depressed its cap-feathers and distended those of cheek and neck.

In Sweden, on June 23rd, 1936, at Vadstena, I watched a pair on a birch-bough within a few feet of me; one stood with outspread shivering wings and sang a sustained measured warbling song, a song sweeter than, and quite different from, any I had ever heard in England, and then chased the other gently round the bough. On the following day at Alvastra I saw a pair, again only a few feet away, and once more heard the warbling song; the two birds were chasing one another on ploughed ground and the singing bird's wings were expanded and shivering as on the day before. These displays, so much more vehement than what I had seen in England, and apparently not unlike that witnessed by Miss Turner, were the more easily observed because of the birds' tameness. In a tea-garden at Göteborg in 1937 one actually picked up crumbs that were lying on the ground between my feet.

In Cheshire, where for many years I had 24 or more pairs under close observation, they are timid and observation is far less easy, but from 1942 to 1944 I paid special attention to the colony in my own field, observations which came to an end only because of the virtual extinction of the colony; weasels discovered the nest-boxes, entered by the holes (which are too small for a House-Sparrow) and killed adults and nestlings, and Little Owls took their share. I never saw anything quite so extreme as the excited behaviour of the two Swedish birds, but noted several forms of display. In the most frequent one, which I saw in February, March, April, May, 1942 and in April, 1943, the birds (sometimes one of three, but more often one or both of a pair) lengthened their necks, making them appear thinner than normal, and pointed their bills to the sky, emphasizing in this way their black throats, and sometimes flitted their wings after the manner of a Hedge-Sparrow, chased one another and chattered volubly. On February 15th, the earliest

date on which I have observed it, one of three engaged in this display ended by flying to a nest-box and standing for some time with its head in the entrance-hole. Another form of display was watched on three occasions when a pair squatted side by side, actually touching, on the top of a nest-box (conveniently near a window) and caressed one another's head and face with their bills, or rubbed against one another. Once I saw one hover over its mate on a bough, but it was a windy day and the hovering may have been caused by difficulty in settling, for I never saw a similar action again.

Threat display took two forms. Once a third Tree-Sparrow joined a pair on a box and one of the pair immediately pointed its bill upwards as in the usual display. A more spectacular form of threat was seen when a House-Sparrow (*Passer domesticus*) tried to enter the box. The pair squatted side by side, pressing close together, and stared full face at the intruder. The effect was quite remarkable; their faces made a strange black and white pattern, strikingly different from their normal appearance, an example of what J. S. Huxley, who cited the Tree-Sparrow itself as a case in point, calls "threat coloration." (*Proceedings of the 8th International Ornith. Congress*, p. 435.) Nine days later, when the urge to protect their nest was presumably stronger, first one and then both of the pair, which previously had hardly moved towards the House-Sparrow, flew at it. In August, however, when both species were dust-bathing in hollows in a dry flower-bed, the smaller bird always got out of the way of any of the dominant House-Sparrows whenever they came to wallow close to it.

At the nest the young, when nearly fledged, are fed from outside and come to the entrance hole to their parents. A dropping which one ejected through the hole was carried away by both adults.

A. W. BOYD.

[In April, 1942, at Kweiyang, Kweichow, China, I observed a party of four Tree-Sparrows indulging in a noisy display closely resembling the familiar performance of the House-Sparrow as described in *The Handbook*, Vol. i, p. 157. This appears to be a case of a species behaving differently in different parts of its range. Readers who have had opportunities of observing Tree-Sparrows in other parts of the Far East may be able to confirm this difference in behaviour.—J.D.W.]

DISPLAY OF FEMALE PIED WAGTAIL IN NOVEMBER.

ON November 4th, 1948, at the Guildford Sewage Farm, I observed a female Pied Wagtail (*Motacilla alba yarrellii*) display to a male of the same species. Both were adult birds. Two birds that had been chasing each other with excited calls pitched on the road-way about ten yards in front of me. I then observed the following: the female stood in front of the male about two feet away, her head thrown back and tail raised perpendicularly over her back. She quivered her wings violently and called continuously; the call was only just audible. She then picked something off the ground, presumably a piece of grit, but soon reverted to her old posture.

All this time the male stood by with shuffling wings. Unfortunately they were disturbed and flew off after about a minute.

In *The Handbook*, Vol. i, p. 227, the female is described as being "usually passive," and no such display is noted. The weather on this date was bright and fairly cold with a moderate south-westerly breeze.

C. R. BIRD.

PLUMAGE VARIATION IN COAL-TIT.

ON November 25th, 1948, at Guildford, Surrey, I saw a Coal-Tit (*Parus ater*) which displayed an unusual plumage variation: the flanks were very dark, appearing black in good light; the dark colour extended to the lower-breast leaving only a thin whitish line in between each side. The rest of the plumage was normal, except that there was no black on the upper-breast or throat, and the under-parts were whiter. The bird was seen in good light and the white nuchal patch was clearly seen.

C. R. BIRD.

RED-BREASTED FLYCATCHER IN IRELAND.

ON October 26th, 1948, a Red-breasted Flycatcher (*Muscicapa parva*) was obtained at Tory Island Lighthouse, off Co. Donegal. The specimen, which was in first winter plumage, forms the sixth obtained in Ireland and the second from Tory Island. It has been placed in the National Museum, Dublin.

ROBERT F. RUTTLEDGE.

FIRST RECORD OF BONELLI'S WARBLER IN THE BRITISH ISLES

AT 19.30 B.S.T. on August 31st, 1948, a warbler, was caught in the Garden trap on Skokholm Island, Pembrokeshire. After a long examination that evening and again on the following morning it was decided to kill the bird. The specimen was sent to Mr. R. Wagstaffe, Director of the Yorkshire Museum, who identified it as a female Bonelli's Warbler (*Phylloscopus bonelli*). Very little was seen of the bird in the field before it was caught, but J. K. records that the rump and tail were noticeably yellowish green, and that the white under-parts, grey head, and pale legs were also striking when seen from about two or three yards. It called "hooet" once or twice when flying into the trap. This is the first record of this species in Great Britain.

Mr. Wagstaffe, in his report to the List Committee of the British Ornithologists' Union on December 15th, 1948, says that, after having examined a large series of *Ph. b. bonelli* Vieillot, and *Ph. b. orientalis* Brehm, he came to the conclusion that the specimen matched more closely the majority of specimens of *orientalis* in colouration, but that the wing measurement 60.5 mm., with the primaries straightened—the method used by Ticehurst—was smaller than the average wing measurement recorded by that authority in his *Genus Phylloscopus*. Moreover, the 2nd primary fell between the 6th and 7th primaries. This is an almost 80 per cent characteristic of *bonelli*, as against a

2 per cent characteristic of *orientalis*. "Nevertheless, it could be argued, on the basis of pure taxonomics", said Mr Wagstaffe, "that the bird is still assignable to *orientalis*, but as I have been unable to find an undoubted specimen of *orientalis* with wing as small as 60.5 mm., and of wing formula $2 = 6/7$, I am prepared to believe, for the time being at least, that the bird is probably, but by no means certainly, a specimen of *bonelli bonelli*." In this belief he was partly influenced by the geographical distributions of the two forms and by the fact that some examples of the typical race are much greyer than others.

At the previous meeting of the Committee it had been suggested that the first example of any addition to the British List should be treated binomially until such time as subspecific assessment could be based on more than one specimen. This was agreed to in the present case.

P. J. CONDER, JOAN KEIGHLEY.

TRAPPED BLACKBIRD "FEIGNING DEATH".

ON September 10th, 1948, I caught a cock Blackbird (*Turdus merula*) in a pull-trap, size 18" x 18" x 24", the bird being well clear of the door when I pulled the cord. I went immediately to ring it. As I approached the trap the bird started fluttering around looking for an exit, but did not dash at the sides of the cage as sometimes happens. I opened the door in a matter of seconds, but failed to catch the bird at the first attempt. As I was about to try again the bird suddenly dropped on to the ground, where it lay flat on its breast. This seemed so unusual to me that I did not attempt there and then to pick the bird up, thinking that possibly it might be hurt, though I could see that it was not stunned as its eyes were wide open. The bird lay there for quite a few seconds with no perceptible signs of movement. To see what its reactions would be I prodded it gently with my finger, but even this had no effect. At that I picked the bird up and held it quite loosely in my hand, where I examined it more closely, but could not detect any signs of injury. After lying in my hand for fully a minute it suddenly came to life and made a vain attempt to escape. I ringed it immediately and released it, upon which it flew away strongly, squawking loudly.

It would be interesting to hear whether any other ringers have had similar experiences.

A. E. MALE.

[The assumption of a kind of cataleptic state under the influence of fright and especially when handled, known for want of a better term as "feigning death", is well-known in some birds such as the Wryneck (*Jynx torquilla*) and has been noted exceptionally in others. A somewhat analogous experience with a Hedge-Sparrow (*Prunella modularis*) is described by G. R. Mountfort in *Brit. Birds*, Vol. xxxviii, p. 368, though curiously enough the bird concerned was one which had been trapped frequently and must have been more or less accustomed to the experience.—EDS.]

ROBIN FEEDING NESTLINGS OF WILLOW-WARBLER.

FROM June 19th to 21st, 1947, I watched a single Willow-Warbler (*Phylloscopus trochilus*) feeding its five nestlings in a nest built under ground-ivy in a herbaceous border in Inverleith Park, Edinburgh. As I never saw more than one Willow-Warbler at or near the nest, I presumed that the present bird had lost its mate, but I was surprised to see a Robin (*Erithacus rubecula*) on about fifteen occasions take food, in the form of quarter-inch long green caterpillars, to the nest.

Whereas the warbler brought insects in its bill, and alighted on a flower stem above the nest before creeping down to it, the Robin alighted on the ground some feet away, and proceeded to the nest under the ivy. When, as happened occasionally, they arrived at the nest almost simultaneously, the Robin would vigorously chase off the parent warbler, after both had disposed of their food.

On June 23rd the young had left the nest and were being fed by the parent warbler alone in the undergrowth in the vicinity of the disused nest. Two Robins, one of which was singing, were sitting in a tree near by and it is probable that one of them was the bird which I had watched feeding the young warblers previously.

IAN H. DRUMMOND.

[Reference to several other cases of Robins feeding young of other birds will be found in D. Lack's *Life of the Robin*, ed. 2, pp. 87-8.—EDS.]

DISPLAY OF SAND-MARTIN IN AUTUMN.

DURING the afternoon of September 6th, 1948, at Camber Sands, near Rye, Sussex, numbers of Swallows (*Hirundo rustica*) and Sand-Martins (*Riparia riparia*) were observed flying in a westerly direction, the majority keeping over or near the beach.

A number of Sand-Martins, perhaps 2,000 in all, were on the sandy beach in several scattered groups.

Through binoculars it appeared that the birds were in pairs, and some were noticed to crouch down on their breasts with wings extended. There was ceaseless movement in the groups and birds were constantly taking short flights to alight again a few yards away. In a single instance one bird was seen to mount another on the ground.

It seems unlikely that the display can have had any connexion with feeding as the area concerned had been covered by the sea about two hours earlier.

It is possible that these birds carried out a migratory movement within a short time, as an abundance of Swallows and Sand-Martins was noticed in coastal areas on September 6th, and far smaller numbers on succeeding days.

L. P. ALDER, JEFFERY H. BOSWALL AND C. M. JAMES.

[The behaviour described is rather closely similar to that reported by Mr. A. S. Thom as observed on July 4th, 1946 and September 13th, 1945, at Cambridge (*antea*, Vol. xl, p. 20).—EDS.]

GREEN WOODPECKER FEEDING ON ELDER BERRIES.

ON October 24th, 1948, in the neighbourhood of Dulverton, Somerset I watched a Green Woodpecker (*Picus viridis*) feeding on elder berries.

The bird experienced great difficulty in maintaining balance on the thin twigs and after about five minutes, lost hold altogether, failed to regain it on the next twig, and descended to the ground where it began to work an ant-hill.

While feeding on the berries, the bird constantly wiped its beak. Watched at close range for a further 20 minutes, it did not return again to the elder bush.

M. G. NEWMAN.

GARGANEY IN IRELAND—A CORRECTION.

I HAVE recently examined the specimen obtained at Wexford on August 16th, 1930, which was originally recorded (*Irish Naturalist Journal*, Vol. iii, page 111) as a Garganey (*Anas querquedula*) and subsequently (*ibid*, Vol. iii, p. 133 and *Brit. Birds*, Vol. xxiv, p. 195) as a Blue-winged Teal (*Anas discors*).

The bird is without doubt a Garganey (a bird with which I was very familiar in India) and appears to be a male in eclipse plumage, as it was originally stated to be.

Apart from subsidiary plumage differences, the fore-wing is of the typical blue-grey colour; the demarcation of the brown breast from the whitish belly is striking and the shafts of the primaries are white. In comparison with skins of the Blue-winged Teal the differences are striking.

There is no reason whatever to suspect any substitution of specimens. The registered number of the specimen in the National Museum is 88/1930.

The above details are given in order to avoid further confusion over this specimen.

ROBERT F. RUTTLEDGE.

CORY'S SHEARWATER OFF SUSSEX.

ON October 15th, 1948, I saw a large shearwater off Langney Point, Sussex. The bird passed at a distance of a few hundred yards and I was able to get a good view through binoculars and telescope. It was obviously larger and more strongly built than a Manx Shearwater (*Puffinus puffinus*), a species with which I am familiar. Also its upper-parts were lighter and browner in colour than those of a Manx. The under-parts appeared white except for the margins of the wings, which were brownish. Despite careful examination through a telescope set at x 35 I could see no white patch above the tail. There was no sign of any "capped" appearance, the sides of the head and throat appearing to have the same greyish-brown coloration as the upper-parts, this merging into the white below without any sharp dividing line. It would seem, therefore, that the bird must have been a Cory's Shearwater (*Puffinus diomedea*).

A strong south-westerly wind was blowing at the time and Gannets (*Sula bassana*) were passing in larger numbers and much closer inshore than is usual in this locality. D. D. HARBER.

WOOD-PIGEON NESTING IN A HOLLOW TREE.

As I can find no reference in *The Handbook* to Wood-Pigeons (*Columba palumbus*) nesting inside a hollow tree, the following note may be of interest.

On September 19th, 1948, I was shown a Wood-Pigeon's nest inside a hollow tree, at Upminster, Essex, which contained a pair of young birds. No attempt had been made to use nesting material.

On my approaching, the adult bird would fly from the tree, so that I was able to make certain that the bird was a Wood-Pigeon, and not a Stock-Dove (*Columba ænas*). The nest was some 20 feet from the ground. M. J. ARDLEY.

AUTUMN DISPLAY OF WOOD-PIGEON.

On October 23rd, 1948, at Studley, near Oxford, I observed three Wood-Pigeons (*Columba palumbus*) perched on a bough of an oak tree. Two of the birds were sitting very close to each other with their necks stretched upwards, and were uttering a rather strange whistling note. When I retraced my steps I saw that all three were sitting together with their necks held up in the air. On seeing me they flew away, although rather reluctantly, two of them alighting in another tree, where, however, I was not able to see if any more display took place.

The Handbook does not record any autumn display for this species.

JOHN REYNOLDS.

[We have no records of autumn display—nor of a display at any time quite like that recorded—but it should not be overlooked that breeding has been recorded in every month of the year and occurs with some regularity as late as September.—Eds.]

WOOD-PIGEON "COOING" ON THE GROUND.

A NOTE has been published (*antea*, Vol. xl, p. 254) about Wood-Pigeons (*Columba palumbus*) "cooing" while on the ground. Over the past five years I have observed this several times in Shropshire and Montgomeryshire, though the "coo" uttered has nearly always been the courting note and not the song. Occasionally, as on July 11th and August 2nd, 1943, the note has been neither of these two, but, to my mind, an intermediate note lacking the intensity of the song and the "purr" of the courting note. In my experience "cooing" on the ground is almost invariably heard late in the afternoon. I have also found that it is most likely to be heard when the birds are feeding on "laid" grain and have not been disturbed, or when they are feeding on newly mown hay, though I have heard the courting note from birds feeding in open, bare meadows.

J. H. OWEN.

TEMMINCK'S STINT IN SUSSEX.

ON September 1st, 1948, we saw a Temminck's Stint (*Calidris temminckii*) at the Midrips, Sussex. The bird was first observed feeding amongst low vegetation on the marshy edge of a small pool together with Ringed Plovers (*Charadrius hiaticula*) and Dunlins (*Calidris alpina*). It was readily picked out from among these by its diminutive size and the uniform grey appearance of its upper-parts. Examination through the telescope showed a brownish mottling on the back not at first visible. The breast was grey and the rest of the under-parts white. On being put up the bird "towered" and uttered its trilling call. In the air at close range the white outer tail-feathers were clearly visible through binoculars.

The bird was again seen by Mr. D. H. Brown and C. St. C. S. on September 4th, but was not seen subsequently.

There are less than a dozen published records of Temminck's Stint for Sussex since the beginning of the present century.

D. D. HARBER AND C. ST. C. SIMMONS.

FEEDING HABITS OF REDSHANK.

THE *Handbook* does not make any mention of a feeding habit of the Redshank (*Tringa totanus*) which I observed on August 27th, 1948, and on subsequent dates, at Pagham Harbour, Sussex. The birds in question were probably in pursuit of small fish and their method of feeding corresponded exactly with that described for the Green-shank (*Tringa nebularia*)—i.e., "by succession of rapid dashes through water with neck extended and bill submerged."

JOHN REYNOLDS.

KENTISH PLOVERS IN HAMPSHIRE.

ON October 10th, 1948, whilst watching a flock of small waders, consisting mainly of Ringed Plovers (*Charadrius hiaticula*) on Stanpit Marsh, Christchurch, my attention was attracted to two birds which appeared distinctly different from the others.

They were slightly smaller than the Ringed Plovers. The back and head were greyish-brown, under-parts white and the legs were dark, not yellow as in the Ringed Plovers. A distinct feature was the presence of small dark patches on the sides of the breast, projecting forwards from the closed wing. Comparison with juvenile Ringed Plovers showed that these latter had an almost unbroken pectoral band, whereas in the birds in question the dark patches stopped abruptly, leaving a clear white breast. The neck was completely encircled by a narrow white ring. No clearly defined head markings were noticed. The birds were not seen to fly.

The light was good, with the sun behind, and the birds were seen at about 25 yards distance with a x 40 telescope. I feel confident that the leg colour was not due to mud, as the birds were feeding on fairly clean sand and none of the Ringed Plovers showed any sign

of muddy discoloration of the legs, and that the birds were female or immature Kentish Plovers (*Leucopoliuss alexandrinus*).

T. F. SHAXSON.

PIPING DISPLAY BY JUVENILE OYSTER-CATCHERS IN CAPTIVITY.

MAKKINK, in his paper on the Oyster-catcher (*Hæmatopus ostralegus*) (*Ardea*, Vol. xxxi, 1942, pp. 23-75), states that young birds of this species are not known to form "piping parties" without the presence of an adult.

Among a consignment of mixed wading birds which arrived at the London Zoo from a Copenhagen dealer in September, 1948, were four juvenile Oyster-catchers which were seen on one occasion to indulge in a "piping ceremony" lasting for at least half a minute.

An adult Oyster-catcher, silent and out of sight in an adjacent aviary, was later introduced to the juveniles, but the display was not observed again.

R. A. RICHARDSON.

PRATINCOLE IN SURREY.

ON September 8th, 1948, at about 2 p.m., one of us (R.S.B.) saw a bird which appeared to be a Pratincole at Barn Elms Reservoir, Barnes. During the afternoon of September 11th the other two of us together watched what was probably the same bird at the same place for about an hour. We made (with glasses) as careful a study as possible of its appearance and behaviour at the time, and all of us have since examined the series of skins of *Glareola pratincola* and *G. nordmanni* in the Bird-room at the British Museum (Natural History). We are satisfied that it was a bird of one or other of these species that we saw, but believe that it was a bird of the year, and we are unable to state whether or not the chestnut-coloured axillary patches characteristic of *G. pratincola* were present. Captain C. H. B. Grant, who knows both species well, tells us that they are very difficult to distinguish on the wing.

For the whole of the time it was under observation, the bird was actively hawking to and fro, mainly low over the water. Once, when chased by a wagtail, it rose to some height. Its flight was reminiscent of that of a swallow. The following field notes were written by one of us (H.A.B.) :—"Head, nape, back and wings sooty-brown. Rump white. Tail forked; appeared black. Belly white. Underside of wings appeared blackish. Chin and throat dark; at times appeared buffish-brown. Flight swift-like, very restless, flapping most of the time, but occasionally a short glide. Hawking most of the time low over water. Shape of wings swallow-like rather than swift-like."

H. A. BAYLIS, A. WILLIAMS AND ROSEMARY S. BROWN.

[A field sketch by Mrs. Brown has also been submitted to us. It shows the blunt head, swallow-like wings, white rump and belly, and black, forked tail and confirms the identification.—Eds.]

NOTE OF LITTLE GULL.

WHILST watching a Little Gull (*Larus minutus*) in second winter plumage feeding in flight at Arnside, Westmorland, on August 14th and September 12th, 1948, we heard it utter only a number of monosyllabic squeaks of variable pitch. There was no note uttered, as far as we could tell, which resembled those listed in *The Handbook*.

J. A. G. BARNES, J. C. S. ELLIS

[It seems likely that this is a persistent juvenile or "immature" note.—EDS.]

STRANGE FLIGHT BEHAVIOUR OF BLACK-HEADED GULLS.

ON November 17th, 1948, at Staines, Middlesex, a flock of Black-headed Gulls (*Larus ridibundus*) was circling slowly around. They were apparently feeding on insects as they would continually "stand" with fast beating wings and take something out of the air with their beaks. One of the birds kept calling loudly and rapidly and at intervals would flap its wings very fast and then roll (not loop) over on its back and glide in this position for a few yards without appreciably losing height. It performed this feat at least six times. The maximum time on the back was about four seconds and in that time it glided at least ten yards.

I have never seen gulls (or any other bird for that matter) do this before, but an acquaintance told me that he saw a gull (of undetermined species) glide several times on its back for distances of about ten yards at Ilfracombe, Devon.

J. O. OWENS.

COMMON GULL DIVING FOR FOOD.

ON December 4th, 1948, at Frensham Great Pond, Surrey, we observed an immature Common Gull (*Larus canus*) in its second winter diving for food. The bird flew over the water at a height of two or three feet, and dived in at an angle of about 80°; on one occasion it was seen to bring some vegetable matter (probably reed) to the surface. This was repeated about five times, although food was seen only once. After each dive the bird rested on the water, but soon resumed its flight. In each dive the body was wholly submerged, but the wing-tips remained above the surface; submersion lasted only about two seconds.

In the "Supplementary Additions and Corrections" section of *The Handbook*, diving for fish at sea is noted as being frequent, but no mention is made of diving for vegetable food inland.

C. R. BIRD AND D. G. HARPER.

HERRING-GULL "PADDLING" ON GRASS FIELD.

ON September 22nd, 1948, an adult Herring-Gull (*Larus argentatus*) was seen with several immature birds of the same species and several Black-headed Gulls (*L. ridibundus*) in a grass field behind my house

near Whitby, Yorkshire. Through glasses it was seen to be "paddling" with its feet. The body remained remarkably still, but the feet and tarsi moved up and down quite quickly—at a guess I should say four beats per second. The head was moved rhythmically from side to side as if the bird was watching for something which might appear on the ground. Nothing, however, was picked up while the bird was being watched. None of the other gulls in the field appeared to be "paddling."

ARNOLD B. WALKER.

[We publish this note because the habit of "paddling" on grass seems to have been seldom remarked on, and so seems worth drawing attention to, rather than because we have any reason to think it uncommon. The habit, of course, is well known on the shore, where it appears to be effective in bringing worms to the surface, and has been recorded as regular on grass in the case of the Black-headed Gull (*antea*, Vol. xvi, p. 228).—EDS.]

GREAT SKUA'S METHOD OF KILLING LARGE BIRDS.

WHILE staying in Orkney in 1948 I watched, together with three friends, a Great Skua (*Stercorarius skua*) attack and kill a fully grown Sheld-Duck (*Tadorna tadorna*). This occurred on Loch Stenness on August 22nd, 1948. Unfortunately, being without binoculars, we were only able to observe the first phase of the encounter. With its vastly superior speed the skua quickly overtook, and came into contact with, its victim. Although we were too far away to see exactly what happened, the skua must have struck the duck a violent blow in mid-air, for immediately following the impact the pursued bird dropped like a stone into the water. As it is inconceivable that the attacker could have killed its prey in flight, one can only assume that it did so by subsequently drowning it—a method said to be now frequently practised by these skuas. This supposition was supported by our finding no injury on the body of the Sheld-Duck that would have accounted for its instantaneous death when the carcass was recovered and examined shortly afterwards. A large portion of the breast muscles had been eaten by the skua, but the head was uninjured.

It would seem that the killing of such a large duck—probably heavier than the skua itself—is a somewhat unusual event, for Mr. G. T. Arthur (who has an intimate knowledge of Orcadian bird-life) informs me that he has neither witnessed nor heard of a similar incident. That gentleman has, however, observed one of these skuas kill an even more powerful bird—namely a Great Black-backed Gull (*Larus marinus*) by keeping its head submerged until it was drowned. Another instance of a gull (species not mentioned) being killed in this way is described in detail by Mr. J. G. Marwick in the Kirkwall paper *Orcadian*, dated July 22nd, 1948.

COLLINGWOOD INGRAM.

[We know of no other cases of Great Skuas killing such large birds as Sheld-Ducks or Great Black-backs, though the killing of Kittiwakes is now well known to be a regular habit of this species. We asked Mr. Kay, the well-known ornithologist of Lerwick, Shetland, for his experience in the matter, and his reply is printed below—EDS.]

Apart from my knowledge of its taking nestling gulls, Eiders, Arctic Skuas, etc., my personal experience of the Great Skua as a killer of the larger birds is confined to adult and immature Kittiwakes (*Rissa tridactyla*) and immature Herring-Gulls (*Larus argentatus*). His method is to overtake on the wing and grab tail or wing-tip, when both tumble to the sea, where the Bonxie gives his victim a nip about the head and then deliberately drowns it by standing on top, balancing itself the while with wings up. The breast is then torn out and eaten. I have an idea that there is not so much killing done in the neighbourhood of a Gannet colony, where a meal can be had more easily by harrying.

I have no knowledge of Bonxies killing ducks of any kind here, possibly because of the wealth of sea-bird life. In Orkney things may be different and I suppose there is no good reason why a hungry Bonxie should not kill a Sheld-Duck. There are fantastic tales of Bonxies killing sheep and lambs, which of course are nonsense. James Jamieson, the old shepherd of Noss, who probably knew Bonxies as well as anyone, told me that he welcomed the Bonxie as it kept away the Raven. During his half a lifetime at Noss, he had never lost a lamb, hen or chicken, by a Bonxie; here there is a wealth of sea-birds, of course.

G. T. KAY.

GREY WAGTAIL AS PREY OF KESTREL.—Mr. A. R. Longhurst informs us that on October 17th, 1947, when on a southbound ship in the Gulf of Suez, he saw a Kestrel (*Falco tinnunculus*) catch in flight, and subsequently eat, a Grey Wagtail (*Motacilla cinerea*). *The Handbook* does not record this species as food of the Kestrel.

EARLY NESTING OF REDSTART.—Messrs. M. Larkin and L. Salmon report that they found a pair of Redstarts (*Phœnicurus phœnicurus*) at Enville, Staffs., which had practically completed a nest on April 24th, 1948. On May 1st there were at least four eggs in the nest, which was robbed shortly afterwards. The breeding season for this species is recorded in *The Handbook* as "occasionally in early May, but usually mid-May onwards".

WHIMBREL WINTERING IN JERSEY.—Mr. W. M. Condry informs us that he regularly saw one and often two Whimbrels (*Numenius phæopus*) between October 7th, 1947, and February 29th, 1948, at Fliquet Bay, Jersey. This locality is not far from Gorey where Mr W. R. Philipson recorded two Whimbrels on February 9th (*antea*, vol. xli, p. 315). Mr. Condry saw one and sometimes two birds almost daily during the period mentioned, except for the last week in January and the first two weeks of February.

NOTICE TO CONTRIBUTORS

British Birds accepts papers and notes dealing with original observations on the birds of the British Isles and Western Europe or, where appropriate, on birds of this area as observed in other parts on their range. Review articles on subjects of current ornithological interest will also be considered.

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EFFECTS OF THE COLD SPELL OF 1947 ON THE COOT IN NORTH SOMERSET

BY

RONALD ALLEY and HUGH BOYD.

FROM late January to March, 1947, there occurred a cold spell of exceptional severity and duration. A paper by Ticehurst and Hartley (1948), to which the reader is referred for data concerning temperatures and other climatic conditions, records the toll it took of bird-life and some of its effects on bird behaviour. Our intention here is to describe in some detail its impact on one of the species most affected—the Coot (*Fulica atra*).

Since March, 1946, we had been keeping the Coot population of Blagdon reservoir, North Somerset, under close observation. Thus when the cold spell began we were already familiar with the normal, routine behaviour, and could follow clearly the changes forced upon the population by the new conditions. Unfortunately, snow-drifts and icing of roads made travel difficult over long periods, and prevented us from visiting the reservoir (some twelve miles distant) as often as we would have wished. One or both of us went there on thirteen days between January 19th and March 23rd. In the same period visits were also paid to reservoirs near by (four to that at Cheddar, and two to Barrow Gurney), and, during the last stages of the cold spell and in the thaw that followed, to various rivers and estuaries in the district.

At the beginning of January, 1947, the Coot on Blagdon numbered 250-275. Several pairs were still together in the territories they had occupied during the previous breeding season, and were continuing to drive off intruders. During a mild "freeze-up" in December, 1946, a belt of thin ice which formed around some of the bays forced at least two of these pairs temporarily to desert their territories, but they were back and defending on the next day, after a slight thaw. Huxley (1934) notes similar instances of Coot deserting their winter territories because of ice. By this season, however, the great majority of the birds were non-territorial, associating together in loose flocks which spent part of their time on the water, and part in cropping the grass ashore. It was noticeable that birds feeding together on land never wandered more than a few yards from the water and always dashed back to it in panic at any strange sound or movement.

All this was changed by the cold spell.

On January 26th it was freezing hard, with an inch of snow on the ground, and more falling from time to time. A party of Coot found feeding rather further up the bank than usual proved very

tame, allowing a car to approach quietly to within twenty yards before taking alarm. The pairs cited above were still in their territories.

Owing to snow-drifts, we were unable to revisit Blagdon until February 10th. There had been a week of intense cold, and, according to a keeper, on the 8th and 9th all the reservoir froze over. When we arrived a few small areas were open, and these were packed with Coot, ducks, and grebes, all feeding actively; even the stream-lets flowing into the lake held in most instances one or two Coot. The territories had been deserted, and no more territorial activity was seen until the thaw. About half the Coot present must at any one time have been feeding ashore. Contrary to expectation, very few of them were feeding close by the lake, probably because all available foodstuffs thereabouts had already been eaten—the scattered areas of exposed grass seemed closely cropped, and bore plentiful Coot faces. But parties of from three or four to as many as 65 birds were in the snow-covered fields 100-200 yards, or even further, from the water. When approached they took wing, flying to the ice or to another feeding ground, or—if we were a long way off—they walked away, even though this meant moving further inland. Many were in a “scruffy” condition, with tufts of feathers sticking out at odd angles, and several seemed weak, collapsing as they ran from us, and flopping forward with one wing sideways and the other skewed underneath the body; but as yet there were no dead birds.

On February 12th there were several corpses, and a bird was seen to die where it sat a few yards out on the ice. Though hidden by one of us under a mound of straw, the body was pulled out and gutted by Carrion Crows (*Corvus corone*) within half-an-hour. From this day too dates the spectacle, unique in our experience, of a Coot clambering awkwardly along a hedge 4-5 feet above the ground.

The ice had decreased somewhat by February 15th. On the north side of the lake an extensive belt was now open; it was well stocked with Coot, and few birds were seen on land in that region. On the south side, where areas of open water were still limited, about half the Coot were ashore, occupying more or less the same fields as before. Several times these parties were seen feeding near or amongst Wigeon (*Anas penelope*), without apparent antagonism. The Coot seemed to be pecking at any dry bents or straw appearing through the thin carpet of snow; in particular they were foraging around ricks of hay and straw. Many sat while feeding. Squabbles over food were noticeably more frequent and bitter than usual, especially amongst the more compact parties. When approached they took wing or scampered off as before except for a few weakened birds which made straight for the bottom of the nearest hedge. (The number of dead had now risen to about ten). Birds returning to the water after a period on land were repeatedly noted to drink several times as soon as they reached it, dipping their bills in the

water, then tilting their heads back to swallow. In normal times it is distinctly unusual to see Coot drink, presumably because they take in enough water while feeding. This day we stayed until dusk, and, as the sun was setting, we saw the Coot coming back from the fields in small groups of 3-9, running or flying with an appearance of urgency. After pausing to drink they entered the water and began feeding among the birds already there. By the time we left no Coot could be seen ashore. On the following evening (February 16th) a similar movement just about sundown was observed, suggesting that it was usual to vacate the fields at night.

Many birds were by now badly iced, especially on the tail, wing-tips and feet. One unfortunate had a row of icicles 2-3 inches long suspended from its tail. In preening special attention was always paid to these areas but, while small beads of ice were seen to be removed, the birds could do nothing to the more seriously affected parts. Icing was sometimes responsible for lameness and inability to fly. We never saw anything unusual, however, in the way the Coot actually stood on the ice. On the other hand, they were often in difficulties walking across thin ice, which gave way beneath their feet and left them floundering; and in alighting they sometimes skidded on the ice and crashed belly-first.

On February 23rd the reservoir was once again almost entirely frozen over, and 4-6 inches of snow lay everywhere. Almost all the Coot were ashore, some at least 400 yards from the bank. They seemed more scattered than hitherto, nearly every field holding a few. Some still flew out to the ice when alarmed, but most now made at once for the bottom of the nearest hedge and squatted there until sought out. With the help of friends we developed a technique for catching them, two persons driving the birds to a hedge behind which the others were waiting to prevent their escape. A chase usually followed, with the Coot dashing along the base of the hedge or down into the ditch, and us in pursuit. On this day alone we caught 35. Most proved very weak, and quite docile when handled, though the stronger birds scratched and pecked vigorously. There were now many bodies about the lake, most of them already gutted by crows, but three or four still intact. A group of four was found, all with the heads bitten off; fox faeces were found alongside a partly-eaten Coot and a partly-eaten Carrion Crow; and a local naturalist described how he had tracked a fox across the ice to where lay the empty carcasses of several Coot. A farmer told us that foxes had become unusually plentiful around the lake since the beginning of the cold spell, and there seems little doubt that they must have found the now crippled Coot easy prey.

One of us opened a series of the more complete bodies and found that they were extremely thin, the fat layers being in most cases quite exhausted. A little food was usually present in the digestive tracts, but consisted only of dead grass or straw. The extent of their emaciation can be judged from the following table, in which

the weights of intact and fresh bodies are compared with the only figures we have for healthy wintering Coot. All the birds listed were obtained at Blagdon. The two healthy birds had been shot.

TABLE I. A COMPARISON OF BODY-WEIGHTS.

	<i>Date when found.</i>	<i>Weight, in grams.</i>
<i>Males.</i>	14.12.46 (shot)	907
	23. 2.47	746
	23. 2.47	712
	23. 2.47	689
	2. 3.47	685
	2. 3.47	576
	2. 3.47	559
	2. 3.47	536
	2. 3.47	520
	14.12.46 (shot)	721
<i>Females.</i>	2. 3.47	505
	11. 3.47	464

It is unfortunate that the series is so small, for the figures suggest a number of possibilities that might have been substantiated by more extensive data. Even so, we may note: (1) the difference in weight between males and females (corresponding to the generally larger size of the former), (2) that birds picked up late in the cold spell weighed less than those found earlier, (3) that a loss in weight of perhaps as much as 40% may occur before death.

Of all the bodies found that could be sexed, 21 were males and only 8 females, suggesting either a considerable preponderance of males in the winter flocks, or that they survived less well than the females. A greater resistance to hard weather by females has been established by Latham (1947) for several Galliformes and the Mallard (*Anas platyrhynchos*).

By February 23rd the number of birds present at Blagdon (including an estimate of the dead) was judged to have dropped a little. It seems that a dispersal to other waters had begun. Members of the Bristol Naturalists' Society reported Coot appearing in unusual localities: several had arrived on the River Avon at Saltford a few days before, and two were seen on the Avon at Hotwells, Bristol (at Saltford the river is clear and slow-flowing, but at Hotwells it is tidal and fouled). Another bird was seen on a small artificial lake (unfrozen, or largely so) some two miles from Blagdon.

By March 1st there were few live Coot left at Blagdon, but many corpses: little heaps of bones and feathers lay everywhere. A pair of Carrion Crows was cleaning out a corpse; and a dying bird was seized and dismembered while we watched by a Great Black-backed Gull (*Larus marinus*). Six bodies were found side by side frozen into the ice on the site of what had been an open pool; all lay with feet stretched horizontally and heads hanging downwards. Presumably they had died before they were frozen in, while passing the night together on the water. Many bodies were discovered near the courses of running streams, one or two actually

in the water. Allowing for remains in the fields and ditches which we did not find, the number of Coot dead up to March 2nd must have been about 130. Only four or five died after that date, for the reservoir was all but deserted. The small parties of live Coot seen did not total more than about 20 birds—though they were now so scattered that a few may have been overlooked.

Since these live Coot and the 130 or so dead together account for only just over half of the birds present at the beginning of the cold spell it is clear that the dispersal must have proceeded much further. Many birds no doubt left the district altogether. On the basis of records of earlier hard-weather movements, Ticehurst (in Witherby *et al.*, 1941) states that the normal southward movements in winter are accentuated during hard weather, and may extend from inland waters and estuaries to the open sea. At such times large numbers are known to gather off the Cornish coast—cf. *Reports of the Cornwall Bird Watching and Preservation Society* (e.g. for 1933 and 1939). These flocks usually disperse quickly after the thaw, though a few small parties may stay long after the lakes are open again.

As the thaw proceeded, so the number of Coot present at Blagdon rose. On March 2nd—as recorded above—only 20 or so were present; on March 11th, with the temperature a little above freezing point and the ice becoming slushy, there were about 35; on March 16th, when the ice had almost gone, numbers were still under 40; but on March 23rd, the thaw being complete, a careful count gave 103 ± 5 . This big increase seems to have been due in part to the presence of birds on passage, for by April 10th numbers had dropped again to 82 ± 4 . The breeding season population eventually steadied at 100—110. The comparable figure for 1946 was c. 220.

On March 16th the first signs of sexual and territorial behaviour were noted. The birds had regained their wildness, and none at all were found on land. It was, therefore, surprising on March 23rd, when all the ice and snow had gone, to see small parties of Coot flying inland some 200 yards to a field which had been a favourite feeding area during February. This would appear to be an example of a habit persisting long after the factors responsible for it had ceased to operate.

Our knowledge of the happenings at the other Somerset reservoirs is limited, because our visits to them were so few. The number of Coot at Barrow Gurney before the freeze-up was probably rather more than 100 (our latest count was 124 ± 5 on December 7th, 1946). On March 9th there were no Coot on or near the reservoirs, which were frozen, but 11 were found on the adjacent filtration tanks, which had remained ice-free owing to the constant movement of the water. At other times Coot are rarely seen on these tanks, and three is the largest number recorded there. The birds were feeding mainly on the moss growing along the sides of the tanks just above water level.

At Cheddar most of the water surface remained frozen over for several weeks, and the Coot were forced to feed in the surrounding snow-covered fields. In January, 1947, there were several hundred Coot present, though we have no accurate counts. On February 22nd there were still at least 230, and on March 1st Mr. P. S. Gale estimated c.200, all feeding in the fields. On March 14th we counted 145 ± 10 . Throughout the cold spell strikingly few bodies were found at Cheddar, as compared with the profusion at Blagdon. The proportion of birds remaining seems to have been about the same; the casualty-rate was very different.

Ticehurst and Hartley (1948) have drawn attention to similar variations in mortality among several species, not only between different parts of the country but within a single county.

The chief factor determining the survival-time of birds at low air temperatures appears to be the availability of a supply of food sufficient for their needs, which are increased in such circumstances. (For information on this point see, for example, Rowan (1925), and Kendeigh (1934).) We are led to enquire whether the difference in the mortality of Coot at Cheddar and Blagdon can be explained in terms of food-supply.

A difference in feeding habits was clearly noticeable. Whereas at Blagdon the Coot fed in small parties (the largest seen being 65 on February 10th) at widely scattered points around the reservoir, at Cheddar they formed a single party, which was always to be found in the same field. This may in part be explained by the fact that the birds favoured the neighbourhood of a drinking-place; and that at Blagdon several small areas of water were open, at Cheddar only one, on the east side (with a second in the centre of this large, almost circular reservoir). Further, as described above, the Coot tended to fly back to the ice when alarmed; and, whereas this was easy from any point about Blagdon, on the south and west sides of Cheddar reservoir the ground slopes away so abruptly that birds feeding in fields thereabouts would have to gain a good deal of height in order to clear the embanked side of the reservoir. However, if food had become very short, it seems likely that the Cheddar Coot would have scattered and foraged more widely. This certainly happened at Blagdon. As the cold spell continued, so the Coot fed further and further from the reservoir. The nearer feeding-grounds were no longer visited, suggesting that they had been exhausted; and, so far as we could judge from an inspection of them, this was in fact the case.

In comparing the food-supplies available during the cold spell aquatic material may be ignored, since it was largely inaccessible. At Blagdon there was a good deal of grassland along the shore of the reservoir, while beyond the limits of the reservoir enclosure the land was predominantly arable, including fields with stubble, recently ploughed land and one field with a root crop. The Coot usually frequented the stubble and such pasture as there was. Until

late in the cold spell the ground lay under snow, which sometimes covered all but the tips of the stubble and a few of the taller weeds. The field frequented at Cheddar was of particularly tussocky grass, so rough and long that it penetrated the snow in many places, and made available a constant supply of food.

No other factor seems to have been of as much importance as food-supply.

The two reservoirs lie only $5\frac{1}{2}$ miles apart, and although Blagdon is to the north of the Mendip Hills and Cheddar to the south, it is most unlikely that the climatic conditions were sufficiently dissimilar to bring about such a great difference in mortality.

Great Black-backed Gulls and foxes were noted preying upon the Coot at Blagdon. We obtained no evidence of predation at Cheddar, though the former at least were present : but in any case, since only much-weakened birds are likely to have been taken, predation must be accounted as of only secondary importance.

Wigeon were the principal competitors for food, often feeding in the same fields as the Coot, but not apparently having any contacts with them. Frequent squabbling took place amongst the Coot, resulting in unsuccessful birds securing less food, and in all depleting their reserves of energy. The proportion of Wigeon to Coot remaining at the two reservoirs was much the same ; and the frequency and bitterness of the squabbling amongst the Coot were, as far as we could judge, very similar. If, however, as we suppose, there was less food available at Blagdon than at Cheddar, it follows that the competition would have a more harmful effect at the former.

There remains to be noticed a difference between the populations which may have been of significance. It is that while the birds at Blagdon in January comprised a mixture of residents and winter-visitors, the Cheddar birds were visitors only. Had we been able to distinguish residents from visitors amongst the dead at Blagdon we might have been provided with a demonstration of differential mortality, but, though we had proof that some residents died, for the most part the origins of the dead were unknown.

In compiling this account we have become indebted to a number of people. We wish to thank the Bristol Waterworks Company for permission to visit their reservoirs. Messrs. G. E. Clothier, R. P. Gait, P. S. Gale, M. Hannam, B. King, H. W. Neal, R. H. Poulding, and D. Sprague supplied additional observations and assistance ; and Mr. G. H. Harvey information on the movements of Coot in Cornwall. Messrs. Henry J. Boyd, H. H. Davis, and P. H. T. Hartley gave us valuable criticisms and advice during the writing of the paper.

SUMMARY.

Observations were made during the cold spell of early 1947 on the Coot of three North Somerset reservoirs, in particular that at

Blagdon. Unusual forms of behaviour are described. Some 135 Coot perished at Blagdon, about half those present in January ; and the breeding population in 1947 was reduced to 100-110, as compared with c.220 in 1946. Mortality at the Cheddar reservoir was much less. Factors responsible for this dissimilarity are discussed, availability of food being considered the most important.

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OBSERVATIONS ON COURTSHIP-FEEDING AND COITION OF THE MARSH-TIT

BY

AVERIL MORLEY.

OBSERVATIONS were made on courtship-feeding and coition of the Marsh-Tit (*Parus palustris*) during the course of a study of this species on 25 colour-ringed and some unringed individuals, which took place during the years 1939-1942, in a North Berkshire wood of mature oak standards with some shrub growth (Morley, 1942).

The feeding of the female by the male during the breeding season has been noted in many species of birds. Such a widespread action must obviously have an important part to play in the crucial behaviour of this time, but its exact significance has not yet been fully explained.

The observed Marsh-Tits showed a slightly earlier breeding-season than that given in the *Handbook of British Birds*, which gives the breeding-season for southern England as about the last week of April. During the period 1939 to 1942, the approximate date of the first egg laid in 8 nests was known, the earliest being April 16th (1940), the latest May 2nd (1941), the latter, however, being the product of a pair showing abnormalities in their relationship in other respects. In a year of "normal" weather the clutches were begun from approximately April 18th.

The earliest date on which feeding of the female Marsh-Tit by the male was observed was April 7th, 1940. So quick and inconspicuous is the action in this early phase that the human observer fails frequently, I believe, to see it. The male first feeds the female in a swift single dash, without her having given any signal or expressed positively a desire for attention. The pass is silent, and takes place infrequently when compared with later behaviour, an hour perhaps elapsing before the action is seen again. The female may be so unready that she fails to take the object proffered, which is dropped, and at first she makes no response after the action. The male may make his dash to the female as she forages in the canopy, and occasionally when she emerges from a visit to the future nest-hole.

The silent form of courtship-feeding described above persisted almost into the egg-laying period, but feeding was then much more frequent and marked the second stage. For example, on April 17th, 1942, the female was fed 6 times in 30 minutes, and was vocally undemonstrative on each occasion, the male merely flying up and passing something to her. The first egg of this pair was laid on the 20th. Once the male called *pits* softly and thrice a dull, tiny wooden rattle sound was heard which may have been caused by his braking with his wings. His wings were fluttered and twitched to a marked degree before each feed, as if from a mounting excitement which found a vent in the act of feeding, and

this was observed in other males on many other occasions. After having fed the female, he was quiet for a few seconds, and then the wing-flickering would start again with increasing fervour. The female's wings were also twitching, coming up like a half-opened fan above her back. This flickering was sometimes so continuous and energetic that the bird, and especially the male, "twinkled" like a star. Several other counts of the rate of feeding were made during this stage, when the wings are flickered according to the rise and fall of excitement, but with no begging action on the part of the female and no note. These counts were : 6 times in 30 minutes, 6 times in 24 minutes, 3 times in 7 minutes and 3 times in 4 minutes, or at the rate of approximately 6, 7.5, 12.5, and 22.5 times in 30 minutes. During this stage, the male might follow a feed by visiting the nest-hole himself, where he sometimes uttered the nasal, harsh version of the *pitchou*, i.e., *pitchar-char-char*.

A third stage in the courtship-feeding behaviour follows when the female shivers, as distinct from twitching or jerking, her wings *after* the receipt of the food. For instance, a female building 30-40 feet up in an oak was frequently fed near the nest-hole by the male, either she flying to him or he to her. The act was quick and undemonstrative, but after some of the feeds she shivered her wings for a moment ; the male's were continually flirting and jerking. This stage appears to last for only a short time, perhaps a day or two.

In the third and fourth week of April (April 18th-26th), and about a week after building began, two further actions appeared in the breeding behaviour of the Marsh-Tit, almost synchronously. These were the female's begging action for food with a characteristic note, and coition. It is probable that the two forms of behaviour are linked.

Quite suddenly, in as little as 24 hours, the female passed from the almost silent food-pass, when if any note is made it is called by the male, to a behaviour in which she uttered continuously a wheezing, creaking and disjointed set of notes, for which I have various transcriptions : *chick-erick*, *sik-ik*, *su*, *chick-er-ick*, *tik-sik-sik*, *su* ; or *see-pee-see*, *see*, *see-persee*, *see*, *see-pee* ; *swee-swee-swer-swe*, *swee-swee-ee* ; *squee-see-ti-ti-see*, *see-squee-see-ti-ti*, *see-ti-ti*. The sequence has a likeness to the collective notes of the young a few days before they fledge, or sometimes it rises to a sort of shrill, almost sweet trill, faintly like the preliminary part of the Tree-creeper's song. Usually, however, it sounds squeaky, grating in quality, and tuneless. It is used until the last week of the fledging period of the young, when it becomes weak and very spasmodic before disappearing altogether. One female called a peculiar low, harsh, single note syllabled as *shuse* or *chowse*, similar to a harsh growling threat-note of the breeding-season, with no resemblance to the normal food-cry of the female. After a few days, phrases of the normal type were interspersed with the *shuse*.

During this period, the period of coition, the female uttered the food-cry with twitching wings and occasionally the flank feathers fluffed, as she foraged. Every now and then she flew to the male or he to her, and, either perched or hovering, he passed her food, while she crouched on her tarsi with wings a little drooped and rapidly vibrating, tail cocked up. The female's wings were shivered before the food-pass as well as during the act, when she saw the male approaching her, and her creaky cry increased in volume and intensity while and just after she was fed. She sometimes in her eagerness moved towards him as he approached. If the male passed the food while perched, he might also shiver his wings with the tips slightly drooped. Later, when the action on his part was declining before its disappearance, the shiver on his part was usually omitted.

The amount of food-cry used is apparently variable from one individual to another. One female I watched through three successive breeding-seasons, with the same male, made very little demonstration in any year, yet her clutches were 9, 9 and 10, so that she was a successful breeder. Once she uttered the short whispery fieldmouse-like note (see below) while crouching and shivering her wings to receive the food; she was then laying her clutch. Another female on April 26th, 1941, called the food-cry continuously from 10.45 a.m. (D.S.T.) to 11.30 a.m., and was calling it when I passed through the territory at 3 p.m. in the afternoon. She was presumably ovulating, as coition was performed twice in the morning period. Two days later she was quite silent in 40 minutes of watching.

The female's desire to be fed eventually outstripped the male's wish to feed her, and she would fly to him calling the food-cry in vain. The following timetable was taken from one pair's behaviour on April 30th, 1941:—2 feeds in $\frac{1}{2}$ minute; 4 minutes, no feed; 2 feeds in $\frac{1}{2}$ minute; 2 minutes, no feed; 4 feeds in $\frac{1}{2}$ minute; 3 minutes, no feed. The 4 feeds in the $\frac{1}{2}$ minute were due to the female's pursuit of the male, whereupon he seized some small object and gave it to her. Another time he did call her with a sharp *tsip-sip*, whereupon she flew to him and was given the offering. Other flights to him, however, procured her nothing. Her wings were constantly jerking and fluttering between feeds, but not his. The above rate of feeding totals 8 feeds in 9 minutes, or approximately 25 feeds in 30 minutes. Three days later, on May 3rd, the same female was fed 19 times in 12 minutes, usually two or three times in quick succession, then a slight pause. This is at the rate of 47.5 feeds in 30 minutes. The food-pass in this stage, when the female is demonstrative and vocal, takes a perceptibly longer time than the very rapid dash at the inception of the behaviour. A slight but perceptible pause occurs as the male passes over the food, then either bird moves off. Aggressive contacts, such as when an interloper is discovered in the territory,

cause the female to stop her food-cry temporarily till the affair is over.

Throughout the breeding-season so far the male paid visits to the nest on his own initiative, as well as when stimulated by seeing his mate do so. These visits become rhythmical and regular during incubation, punctuating patrols of the territory and foraging. He might approach the nest silently until the last few yards, or begin his usual soft *tsip-sip* notes, or sometimes *pitchou*, from as far off as 100 yards from the nest, calling as he approached. Rarely, the female replied to the male's *pitchou* with a *pitchou* or two from inside the hole; if she replied to the softer notes, she was inaudible to me outside. The male might or might not bring visible food in his beak. In the earlier part of the cycle the food given was so small and inconspicuous as to be difficult to identify. Through field glasses, it most resembled small oak buds. Now, visible food was often easily identifiable as large and succulent green caterpillars. He either perched at the entrance of the nest-hole and put his head inside, passing the food to the female which must have come up the passage-way to meet him, or he perched close to the nest, calling, the female responding by leaving the hole. She might emerge on hearing him while he was still (as much as 50 recorded) yards away, or she might take up to $\frac{1}{2}$ minute to come out, while he continued to call, restlessly changing perches round the hole. The female, as she left the hole, frequently uttered the skirling mouse-like note associated with coition, but without intensity, and once clear of the hole might shiver her wings, and usually gave the food-cry. She was then fed by the male, and, still calling, wandered off with him in the environs of the nest. The male usually fed her at frequent intervals during her time off the nest, such as at the rate of twice or once a minute. She appeared to decide herself when to return to the nest, suddenly darting back with a soft *tsip*, or *pitchou*, or disconnected fragments of the food-cry. During the second week of incubation the visits of the male take place at less frequent intervals, but fairly rapid feeding of the female upon emergence continues. If the female comes out on her own, as she occasionally does during this period, the food-cry is not uttered, unless she meets her mate in the wood.

If the female brought food to the nestlings during their first four days of life, that food was not visible in her bill. I think it probable that she merely continues her rhythm of brooding punctuated by spells off, during which she may utter food-calls as during incubation. Certainly she was fed at the hole by the male, as before. The male's attentions to her were now divided, however. He might call at the hole with *pitz*, *pitsup*, *pitsu*, etc. She might emerge, and he would then enter the hole, leaving her to hang about outside, perhaps calling *pitchou* or *pitsu*, till he re-appeared, when she would change to the food-cry. Sometimes she remained

in the nest during his visit, and it is possible that he then passed the food to her and not direct to the nestlings.

The female continued to use the food-cry and, less frequently, to be fed by the male, up to the 12th day of their nestlings' lives, when it was given in a very fragmentary manner, but it was not recorded thereafter. Occasionally, when the male met the female at the nest hole or if she was in when he arrived he passed his catch to her or she came up the passage-way to get it, but this was not usual in the second half of the rearing period.

It has been mentioned that the fourth stage of courtship-feeding coincided with coition, the culmination of a long chain of sexual behaviour begun in the previous December. The female's posture in both actions was similar. Complete coition was observed on five occasions, and two abortive attempts were also seen. The five normal occasions showed the same pattern, with variance of details.

On May 5th, 1939, a pair were foraging in shrub growth, the female uttering the food-cry, and jerking and flickering her wings, the male feeding her every now and then. Suddenly he began a whispery, skirling, fieldmouse-like note but with an intense and trilling quality, from a perch a little above and about a yard away from her, lasting for approximately six seconds. She fell silent, but crouched low and shivered (as distinct from jerking) her wings. He then floated down on to her with a peculiarly slow, sailing flight, tail widely fanned, and as he descended he changed the whisper-trill into a low *yu-yu-yu* or *yug-yug-yug* song-note of a beautiful and tender quality, un-tit-like. He remained on her back for two seconds, then both flew to different trees, while she began the wheezy food-call again.

On April 23rd, 1940, after 15 minutes' absence from the nest-site, a pair appeared, the male singing very softly and the female carrying a bunch of white nesting material in her bill. She flew to an elder close to the nest, and as she perched she crouched and uttered a stream of the whispering skirl, while her drooped wings were rapidly vibrated. The male sailed down, uttering the low throbbing *yu* note, and mated with her. He then crouched on her back for two or three seconds, his shoulders hunched and his drooped wings shivered over hers, hiding her body from view, and apparently both uttering the sibilant, jet-like whisper, his bill widely open, in a stream of sound. Then he lifted himself a little in the air and mated with her a second time, again uttering the *yu* note. He then flew off and wiped his beak on another perch, while she flew down to the nest-hole with her bundle.

On April 26th, 1941, a pair whose nest was not found, were seen in the centre of their territory. For the first 15 minutes, the female was continually uttering the food-cry, the male feeding her once or twice a minute, followed by a two minute interval without food. At 11 a.m. (D.S.T.) when they were in a blackthorn bush, the female

became remarkably restless and noisy, seeming unable to keep still, her wings in a perpetual flicker. After a minute the male flew to her and she fell silent, but her wings vibrated violently. He then flew on to her as she crouched, and one bird, I did not identify which, uttered the piercing trilly whisper, followed by the male's *yu-yu-yu* as he bent his tail under hers. He at once left her back, found some food and fed her. The same routine was resumed, the female wheezily calling while foraging, the male feeding her at intervals, and they drifted back to the oak canopy. At 11.20 a.m. she stopped calling, flew to the blackthorn bush, and called the ordinary call-note *tsip* several times. Then silently she began to shiver her wings violently and flew up to the male aloft in the oak. As she approached he also rapidly vibrated his half-opened wings, and after a second opened his bill and with widely parted mandibles uttered the skirl or whisper-trill. Still calling this he flew on to her back, and as he pressed his tail under hers again uttered the *yu* note and again fed her immediately afterwards.

On May 20th, 1941, coition was observed between a pair the day before their clutch hatched. This pair have already been referred to as having had abnormalities in their association. The female was brooding in the nest, and at 6.55 p.m. (D.S.T.) the male appeared and perched about 18 yards from the hole, loudly calling *pitchou* for 2 or 3 seconds. The female darted out and flew to him. He uttered a brief trill-whisper which merged into the *yu* note as he got on to her back. Her wings were vibrating, his fluttering to maintain his balance. He mated with her, and after coition she shook out her feathers, flew to another perch and began the food-call.

The first abortive attempt at coition was also the earliest date recorded for the act, April 11th, 1940. The male of a pair which were close to some elders was calling the nasal *pit-char-char* note, changing shortly to the ordinary *pitchou*, and then to song, but had only given three or four phrases when the female flew to a branch about a foot away, faced him and shivered her wings, which were a little drooped, her flank feathers fluffed. She crouched and raised her tail, and uttered very softly the whisper-trill. Still singing, the male flew to her, but as he did not turn in flight he landed on her back the wrong way round, his tail over her head. He scrambled round to the correct position, but the female's impulse appeared to be over, and he was only able to make an ineffectual dab at her rump before she flew off.

Another abortive attempt at coition was seen on April 26th, 1941, at 2.5 p.m. The pair had had a fight with an unidentified intruder, after which they visited a group of elders containing holes. The female then flew into a sycamore, to a perch above my head, followed by the male, which tried to mount her without any preliminary on her part. He drooped and shivered his wings and hopped on to her back, but she did not crouch or lift her tail and he came off, and

with slowly beating wings glided to another perch with a display flight. The whisper-trill and the *yu* song-note were both absent.

Southern (1946) described coition observed on April 11th of that year between a pair of Marsh-Tits, in which the female, which was engaged in nest-building, initiated the act by adopting the crouching posture with tail cocked. He describes the sailing flight of the male on to the female's back, but does not mention the two notes invariable in the complete coitions described above. His observation was made in Cheshire.

SUMMARY.

The development and pattern of courtship-feeding in the Marsh-Tit are described, followed by descriptions of five perfect and two abortive coitions.

REFERENCES.

MORLEY, A. (1942). Effects of baiting on the Marsh-Tit. *Brit. Birds*, xxxv, pp. 261-266.

SOUTHERN, J. (1946). Display flight of Marsh-Tit. *Brit. Birds*, xxxix, pp. 316-317.

BIRD PHOTOGRAPHY BY HIGH-SPEED ELECTRONIC FLASH

BY

ERIC HOSKING.

THE photographs shown on plates 39 to 50 were taken by high-speed electronic flash. That is a high voltage electric discharge through a tube of glass or quartz filled with certain rare gases, usually krypton or xenon or mixtures of them both. These gases glow very brightly under the action of the electric current and can easily be made to produce a flash many times brighter than bright sunlight and with a very brief duration. The flash can be made as short as one micro-second but in practice is more usually arranged to last about $1/10,000$ th second. The power for a portable flashlamp is derived from a small accumulator which feeds through a vibrator and high-ratio transformer to charge a condenser pack to about 2,500 volts. This voltage is applied to the electrodes of the discharge lamp, but the lamp does not flash until the gas between the electrodes is ionized. This condition is brought about by a further high-voltage pulse generated at the instant one wants to fire the flash. The actual initiation of this trigger pulse is effected automatically by a small contact built into the shutter mechanism of the camera and so adjusted that the flash occurs at the moment when the camera shutter, set at its fastest speed, is fully open.

For those who are interested in the purely photographic aspect the following technical details may be of value. A flash energy of about 300 joules was used with a lens aperture of $f/36$ with two lamps at a distance of 4 feet from the subject.

The principal points which require attention in the use of this technique are the timing of the exposure and the focus. It will be appreciated that a small bird flying some 4 feet in front of the camera is in the field of view of the lens for only a very short time. In the case of a bird flying at 15 miles per hour the available time in which to make the exposure is only about $1/10$ th second and to get the bird near the centre of the plate when it is in focus requires even more precise timing. It is here that I should like to express my very deep appreciation to Dr. P. S. H. Henry of Manchester not only for building the high-speed flash set used to take these photographs but also for devising a photo-cell trip that would automatically operate the camera shutter, and with it the flash, at the instant the bird passed through a pre-arranged zone in front of the camera. With this ingenious apparatus the bird thus takes its own photograph at the moment that it is itself in focus.

Apart from the thrill of using high-speed flash and the satisfaction of the striking results obtained by it, the method promises to be of value in the analysis and understanding of bird flight, and the attitudes revealed may well suggest means of advancing the science



HIGH-SPEED PHOTOGRAPHY.

FIG. 1. BLUE TIT.

FIG. 2. GREAT TIT.

(Photographed by ERIC HOSKING).



FIG. 3. COAL-TIT.



FIG. 4. MALE REDSTART ABOUT TO ALIGHT WITH FOOD FOR YOUNG
(Photographed by ERIC HOSKING).

HIGH-SPEED PHOTOGRAPHY.



FIG. 5. MALE REDSTART ABOUT TO ALIGHT WITH FOOD FOR YOUNG.



HIGH-SPEED PHOTOGRAPHY.

FIG. 6. MALE REDSTART ALIGHTING.

(Reproduced by permission of the British Museum)



HIGH-SPEED PHOTOGRAPHY.

FIG. 7. MALE REDSTART ABOUT TO ALIGHT WITH FOOD FOR YOUNG.

FIG. 8. MALE WHINCHAT ABOUT TO ALIGHT.

(*Photographed by ERIC HOSKING*).



HIGH-SPEED PHOTOGRAPHY.

FIG. 9. MALE WHINCHAT ABOUT TO ALIGHT.

FIG. 10. MALE WHINCHAT ALIGHTING.

(*Photographed by* ERIC HOSKING).



HIGH-SPEED PHOTOGRAPHY.

FIG. 11. FEMALE WHEATEAR BRINGING FOOD TO NEST.

FIG. 12. MALE WHEATEAR BRINGING FOOD TO NEST.

(*Photographed by ERIC HOSKING.*)



HIGH-SPEED PHOTOGRAPHY.

FIGS. 13 AND 14. MALE WHEATEAR BRINGING FOOD TO NEST.

(*Photographed by ERIC HOSKING*).



HIGH-SPEED PHOTOGRAPHY.

FIGS. 15 AND 16. SAND-MARTIN.

(*Photographed by ERIC HOSKING.*)



HIGH-SPEED PHOTOGRAPHY.

FIGS. 17 AND 18. SAND-MARTIN.

(*Photographed by* ERIC HOSKING).



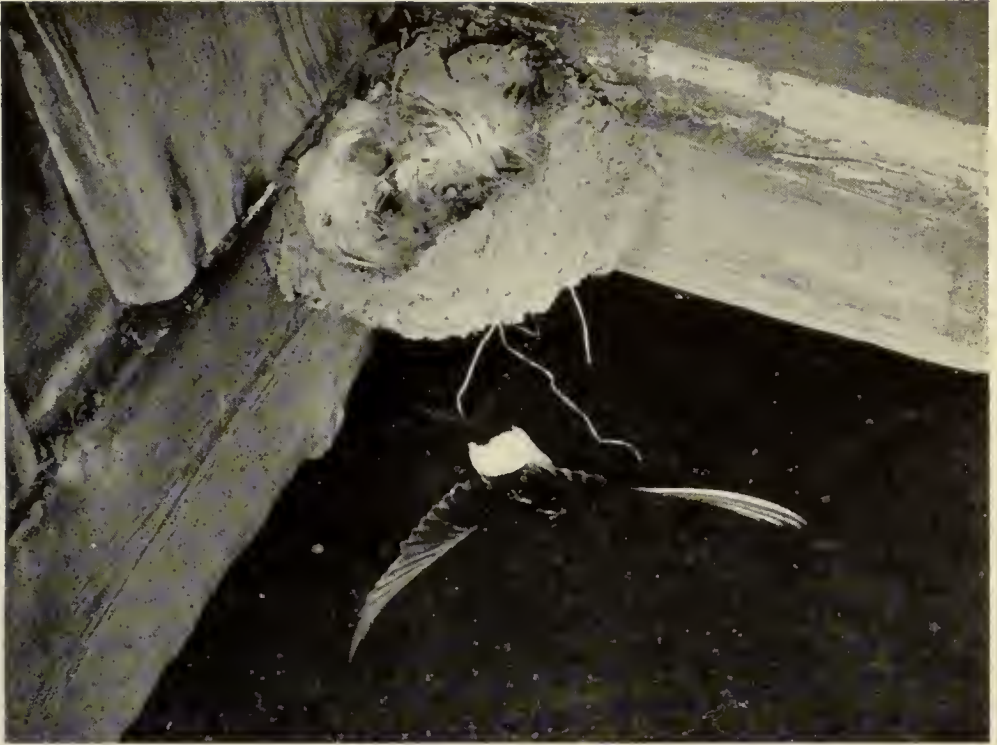
HIGH-SPEED PHOTOGRAPHY.

FIG. 20. HOUSE-MARTIN LEAVING NEST.

(Photographed by ERIC HOSKING).



FIG. 19. SAND-MARTIN.



HIGH-SPEED PHOTOGRAPHY.

FIG. 21. HOUSE-MARTIN LEAVING NEST.

FIG. 22. HOUSE-MARTIN AT NEST.

(*Photographed by* ERIC HOSKING).



HIGH-SPEED PHOTOGRAPHY.

FIG. 23. SPOTTED FLYCATCHER LEAVING NEST.

FIG. 24. SPOTTED FLYCATCHER BRINGING FOOD TO NEST.

(Photographed by ERIC HOSKING).

of aeronautics. Moreover the portrayal of the more active phases of bird behaviour, particularly of courtship and aggressive displays, both of which have periods of intense animation—as may be seen in the illustrations to “Reactions of Some Passerine Birds to a Stuffed Cuckoo” (Edwards, Hosking & Smith, *British Birds*, Vol. xlii, plates 1 to 9)—as well as the identification of food carried in the bill, and the recording of feeding behaviour at the nest and indeed of a great part of the active life of a bird, should all add materially to knowledge of bird life.

NOTES.

CARRION CROW DISPLAYING TO HOODED CROW.

ON March 13th, 1949, I was watching a single Hooded Crow (*Corvus cornix*) on the heath near Icklingham, Suffolk. A Carrion Crow (*Corvus corone*) settled near by and hopped up close to the Hoodie which however took no notice but continued feeding on some objects on the ground. The Carrion Crow then retreated a few yards and jumped up in the air alighting close to where it left the ground. This was repeated several times but evoked no response from the feeding bird and the Carrion Crow flew away.

On reference to *The Handbook* I was surprised to find this type of display attributed to the Hooded Crow only. C. F. TEBBUTT.

[Although the type of display referred to does not appear to have been recorded in the Carrion Crow it cannot be doubted that the displays of the two birds are really identical. As is well known they interbreed freely where the ranges of the two forms meet, as in Scotland, and it has been held with much justice that they should be regarded as forms of one species (*cf. antea*, pp. 165-166)—EDS.]

COITION OF CARRION CROW ON GROUND.

WITH reference to the Carrion Crow (*Corvus corone*) *The Handbook of British Birds* (Vol. 1, p. 15) states: "Coition observed both on nest and in neighbouring tree." In the circumstances it may be of interest to record that on the afternoon of March 13th, 1949, in a pasture at Low Gosforth, Northumberland, I observed a pair of Carrion Crows in the act of copulating on the ground, the cock being mounted on the hen with wings flapping. When they separated the hen moved forward with tail feathers outspread.

C. J. GENT.

JAYS EATING PLANE BUDS.

ON several occasions in late March, 1948, whilst watching Jays (*Garrulus glandarius*) in Kensington Gardens, I saw them eat the buds of the plane trees. At first I thought they might merely be pulling them to pieces, but close observation through 9 x 35 binoculars showed that although much of the bud was discarded along with its brownish outer coat a portion was swallowed, or, in some cases, retained in the gullet for use in courtship-feeding.

It seems possible that deficiencies in the diet of town birds may make them consume green food that would not otherwise appeal to them: I have noticed London House-Sparrows (*Passer domesticus*) habitually devouring the buds of ornamental fruit trees in a Bullfinch-like manner; and at an Army Camp in Egypt in 1945 the House-Sparrows, whose food seemed to consist almost entirely of bread scraps, would eat completely any young grass shoots as soon as they discovered them, whilst similar behaviour by improperly fed captive birds is of course commonplace.

DEREK GOODWIN.

[In the report (*antea*, Vol. xxxiii, p. 92) of the enquiry into bud destruction by birds, the late Sir J. C. F. Fryer writes: "The

results indicate that the buds of bushes or trees have become a definite part of the [House-Sparrow's] diet." The habit does not seem to be confined to town birds, but also occurs in the country. —EDS.]

"INJURY-FEIGNING" OF CHAFFINCH.

ON about a dozen days during May and June, 1948, I visited the nest of a Chaffinch (*Fringilla cælebs*) in a wood near Altrincham, Cheshire, and each time the hen bird "injury-feigned" as I approached the nest. The first few days the hen was laying, but she still fluttered off the nest and fell to the ground dragging one wing behind her and fanning her tail. During incubation the performance grew more strong and excited and the bird would run round me dragging her wing.

JOHN SOUTHERN.

ON June 6th, 1948, as I was walking along the road from Llang-mynech to Llansantffraid, on the Shropshire-Montgomery border, I saw a hen Chaffinch (*Fringilla cælebs*) cross the road in front of me to feed young in a nest in the roadside hedge. As I returned I was hugging that side of the road, which had no footpath, almost brushing the hedge. The cock Chaffinch came out of the hedge, between two and three feet from the ground, and dropped down almost on to the road, only inches in front of me. He opened his wings, puffed out his feathers, and skimmed just on the surface. He must have flown, but yet seemed only to be fluttering his wings. Although he was very close to the surface of the road I am sure that he did not touch it. The tail was partly fanned. He disappeared into the hedge on the other side of the road. His action was very similar to that of a Reed-Bunting (*Emberiza schæniclus*) nesting in a tuft of rushes on the narrow division between two pools in an old brickfield at Pool Quay, on May 24th. The first time this bird was disturbed it went as usual along the division. The second time I prevented this and it gave an "injury-display" across the pool. It was almost exactly like that of the Chaffinch and I was amazed that it could keep so close to the water and not touch it. This is the only occasion that I have seen a Chaffinch "feign injury" and I have met no one who has seen one. I may add that although the action was clearly of a type covered by the term "injury-feigning" it was not particularly suggestive of injury, as many such displays are, so that the more general term "distraction display" would perhaps be more applicable.

J. H. OWEN.

"INJURY-FEIGNING" OF YELLOW WAGTAIL.

WITH reference to Dr. G. Beven's note on "injury-feigning" of Grey Wagtail (*Motacilla cinerea*) (*antea*, vol. xli, p. 274) we should like to record that we witnessed "injury-feigning" of Yellow Wagtail (*Motacilla flava flavissima*) on June 19th, 1948. We were walking along the shore at Stert, Somerset, with our dog, when

we observed a hen Yellow Wagtail calling excitedly from a fence. As the dog approached the bird flew to the ground and fluttered along for a few yards trailing one wing, and still calling—it then flew to a wall and kept some distance from us. A brief search, which was all we had time for, revealed no sign of nest or young, but after we had moved on the bird flew back to the same spot.

D. & M. SUMMERS-SMITH.

SPRING ROOST OF YELLOW WAGTAILS.

ON April 18th, 1949, in company with J. S. S. Beesley, J. F. Burton and A. H. Macpherson, we were able to observe at a reed-bed at Fairfield, Walland Marsh, Kent, an unusual roost of some 40-50 Yellow Wagtails.

The birds were seen to fly in just before dusk in ones and twos and go straight into the reed bed. We disturbed and examined the birds carefully and found them to comprise ordinary Yellow Wagtails (*Motacilla flava flavissima*) and at least four of the Blue-headed race (*Motacilla f. flava*).

The same locality was visited an hour after dawn on April 19th, but the birds had all dispersed. At dusk the same day two of us (G. E. M. & D. F. O.) paid a third visit and made observations comparable exactly with those of the previous evening.

As *The Handbook* does not mention pre-nesting roosting, we feel it worth while placing our observations on record.

G. E. MANSEY AND D. F. OWEN.

[I have several records of similar behaviour by males, e.g. a flock of about 15, with hundreds of Pied Wagtails (*M. alba yarrellii*), roosting in a reed-bed by a Cheshire mere, April 21st, 1913; a party of 20 to 30 roosting in a reed-bed, April 23rd, 1928. The habit may therefore be commoner than is suggested by the apparent absence of any published records.—A.W.B.]

LONG FLEDGING-PERIOD OF TREE-CREEPER.

A pair of Tree - Creepers (*Certhia familiaris*) at Sampford Arundel, Somerset, began to carry nesting material behind a piece of loose bark on an acacia tree on April 17th, 1949. On May 17th, 30 days later, the young were being fed. They may have hatched out a day earlier, as on the 16th I saw the birds go to the nest four times between 8.10 and 8.30 a.m., but on the 17th I watched from 9.45 to 11 a.m. and saw both birds carrying in food continually. The young ones flew on June 5th. This gives a fledging period of certainly 19, and possibly 20 days. *The Handbook* gives the normal period as 14-15 days.

E. M. WILLIAMS.

FIRECREST IN PEMBROKESHIRE.

ON April 17th, 1949, a Firecrest (*Regulus ignicapillus*) was trapped on Skokholm Island, Pembrokeshire. It was thought to be a female. It remained in the garden throughout the afternoon of

that day, and in the vicinity of the traps on April 18th. The bird was remarkably tame, allowing four people to photograph it from a distance of about three or four feet. This is apparently the first record for Pembrokeshire. P. J. CONDER AND JOAN KEIGHLEY.

[We understand that in some parts of the country Firecrests were present in unusual numbers during the winter of 1948-9. We would welcome records of any not yet reported to us—EDS.]

LEG COLOUR OF WILLOW-WARBLER.

A Heligoland type trap was established at Fayid (Egypt) on March 17th, 1949, and by March 27th, six Willow-Warblers (*Phylloscopus trochilus*), all identified by wing-formula, had been caught and ringed. All had legs of a very dark chocolate colour. Before the trap was set up, all *Phylloscopi* seen had been identified as Chiffchaffs (*Phylloscopus collybita*) because of their dark leg colour. Colonel Meinertzhagen in his *Birds of Egypt*, states that Willow-Warblers are very rare in Egypt in spring. A theory which might account for these facts is that the light brown leg colour normally seen in England is a characteristic of the breeding period, and that the dark-legged birds occasionally reported in England are birds that have not yet reached full breeding condition. No Chiffchaffs have been caught in the trap. Their migration dates are earlier than those of Willow-Warblers, and probably all had left before it was set up.

D. J. MAY AND H. G. BROWNLOW.

FREQUENT "INJURY-FEIGNING" OF WILLOW-WARBLER

As "injury-feigning" of the Willow-Warbler (*Phylloscopus trochilus*) is apparently infrequently observed we thought the following might be of some interest.

During May and June, 1948, we had occasion to visit a number of Willow-Warbler's nests in Cheshire and at practically every one we observed "injury-feigning" as we approached the nest. The adult bird would fly out from the nest and flutter along the ground with trailing wing and depressed tail. The same bird would perform this every time we visited the nest; this was the general expectation as we visited the twenty or so nests and we were rarely disappointed.

JOHN SOUTHERN AND ROGER WHITTENBURY.

[Recent evidence may be considered to have established that "injury-feigning" in this species is less infrequent than has been supposed. Nevertheless D. J. May in detailed observations extending over two seasons and involving well over twenty different nests with young, only observed four cases, two of these relating to the same pair (*antea*, Vol. xl, p. 10). The experience of our present correspondents is thus surprising.—EDS.]

LATE SONG OF MARSH-WARBLER.

ON September 10th, 1948, at Mere in S.W. Wiltshire, I heard a Marsh-Warbler (*Acrocephalus palustris*) in full and sustained song.

This is considerably later than the cessation of song suggested by the chart in *The Handbook*.
J. SOUTHERN.

BLACKCAP FEEDING YOUNG ON LARGE DRAGON-FLY.

WHILE photographing Blackcaps (*Sylvia atricapilla*) at the nest in June, 1948, in north Cardiganshire I watched the hen bring the body, from which the wings had been removed, of the large dragon-fly, *Aeshna cyanea*, and feed it head first to a week-old chick. It looked an enormous thing for a callow nestling to swallow, but after holding the dragon-fly with the tail protruding for two or three minutes, the young bird managed to gulp it down.

HAROLD E. WRIGHT.

DARTFORD WARBLER BREEDING IN ESSEX.

MY father and I were walking in Essex on July 13th, 1948, when we were attracted by the singing of a warbler. Both of us are familiar with the song of warblers in Northamptonshire, but this was different from any we could name. We made our way to a clump of brambles where the singing bird was. We observed it from a very close range, 10 or 12 yards, but I also had binoculars. The most outstanding features were the long tail (about length of body), and the red eye. The following is a description of the bird.

Crown, nape, ear-coverts and side of neck, grey. Hind neck, back and rump, rich brown. Tail blackish, outer tail feathers dull white. Wing darker brown than mantle, with grey edging to primaries and secondaries, wing coverts showing much slate grey. Side of body, flanks, under tail-coverts, etc., pinky-brown. Legs, deep yellow. Bill yellowish, paler underneath.

While I was taking notes, the female came on the same bush; she was a duller coloured bird than the male, lacking any grey on the crown. Both birds were now very excited, the cock having the appearance of a peaked crown, i.e., crown feathers standing upright.

We disturbed the birds and searched for a nest; we were not successful in finding one, but a young bird ran from underneath the bush. We picked it up, and although we examined it carefully, we failed to notice any difference from other young birds of this age, evidently about 14 days. We decided not to search any longer, as we were attracting the attention of people in the immediate vicinity. Taking home the notes we had made, we can only conclude that the birds were Dartford Warblers (*Sylvia undata*).

R. E. BURTON.

HOUSE-MARTINS SETTLING ON TREES WITH FOLIAGE.

ON August 28th, 1948, at Highclere, N. Hampshire, at 2.0 p.m., about 150-200 House-Martins (*Delichon urbica*) were seen overhead hawking for insects. From time to time the birds settled in large numbers on the upper branches of four larch trees, where some of them preened while others were seen to be taking insects from the

branches, climbing along with the aid of their wings. They were very restless, a number continually flying around and landing again, giving an impression of perpetual movement, though on one occasion later in the afternoon practically the whole flock remained in the trees for nearly 15 minutes. When they were perched it was seen that they were almost entirely young birds. At about 5.0 p.m. the flock dispersed and the only House-Martins to be seen were those normally frequenting the area, a matter of a dozen birds.

The Handbook mentions settling on bare boughs for this species, but not on foliated trees, nor does it mention feeding while perched. Unfortunately the height of the trees made identification of the insects impossible.

D. AND M. SUMMERS-SMITH.

ON August 28th, 1948, I noticed that several of a large flock of House-Martins (*Delichon urbica*) were settling among the leafy outbranches of an old elm tree in a garden at Hook Norton, Oxfordshire. This in itself is surely unusual; but I was further surprised to observe that they were pecking at the leaves, presumably finding numbers of insects upon them. It seems from *The Handbook* that all food is supposed to be taken on the wing, and also that martins normally settle on bare boughs of trees only. I watched this process for some time, however, and am quite certain that these observations are correct. I would suggest that possibly the warm day had brought the insects on to the sunny top leaves and that they attracted the attention of the martins, skimming and circling the tree, and induced them to settle and feed in the unusual manner described.

R. W. H. NIND.

[To the best of our knowledge, such behaviour is quite exceptional. The coincidence of date is curious and suggests that possibly the same kind of insect was involved in the two cases although the trees were different.—EDS.]

DISPLAY OF KINGFISHER.

WHERE the River Ter is crossed by the main Chelmsford—Colchester road, on January 2nd, 1949, we saw two Kingfishers (*Alcedo atthis*)—beaks together—rising, sinking and fluttering their wings as one bird on the surface of some green waterweed in the flooded river. We heard some peculiar small bell-like notes as they rose from the water and landed on an adjacent branch, where one bird with a reddish fish offered it to the other, whose wings shivered like those of a young bird at feeding. This last mentioned Kingfisher was giving the bell-like notes. They then flew to overhanging branches and we lost sight of them.

REGINALD W. ARTHUR AND JOHN CUTTER.

GOLDEN EAGLE RUNNING.

IN the summer of 1946 I was watching a Golden Eagle (*Aquila chrysaëtus*) standing on the top of a cliff. After a time it became

on the alert, and ran quickly, with short mincing steps, to a rocky knoll. It reminded me in its locomotion of a gigantic Starling (*Sturnus vulgaris*.) I do not remember having seen a Golden Eagle run before, as the movements of this great bird are normally slow and dignified.

SETON GORDON.

MARSH- AND HEN-HARRIERS IN LANCASHIRE.

HARRIERS are by no means such rare birds in Lancashire as published records indicate. For some fifteen years before the outbreak of war in 1939, I used to spend a good deal of time shooting wildfowl along the north-west coast of England, and it was during this period that I used to see harriers on the salt marshes. Normally they were seen at a distance, flying low and quartering the marsh looking for food, but on three or four occasions a harrier passed within gunshot, and one morning at sunrise one nearly alighted on my head as I sat against the brow of the marsh. Four single birds, in different years, that came near enough to be identified were Hen-Harriers (*Circus cyaneus*) and I have little doubt that the others were of the same species. In November, 1930, a Hen-Harrier remained on the Cockerham Marshes for a week, and another was present in the same area from November, 1938, to January, 1939; four or five other single birds were seen in the autumns between 1929 and 1939.

The harriers that are now-a-days frequently at Leighton Moss are Marsh-Harriers (*Circus æruginosus*). I have not seen more than one bird at a time, but single birds have been present for long periods of months during the last three years. Formerly their visits were rare events, but now a Marsh-Harrier may be as often present as absent. Single birds were here throughout the spring and summer of 1946 and again in 1948.

R. A. H. COOMBES.

SPARROW-HAWK'S UNUSUAL METHOD OF HUNTING.

ON January 1st, 1949, whilst passing along a woodland ride, my attention was drawn to two female Sparrow-Hawks (*Accipiter nisus*) which were making repeated short flights towards the bole of a large beech but always checking and returning to their respective perches.

It was not until the birds made a swoop earthwards that I discovered that a Red Squirrel (*Sciurus vulgaris*) was the object of their attacks. Both birds attempted to take the animal, but somehow got in each other's way to the benefit of the squirrel, though even so one of them could apparently have taken it while it was ascending the trunk.

JOHN C. S. ELLIS.

OSPREY IN CARDIGANSHIRE.

ON September 7th, 1948, at full-tide at the mouth of the River Leri on the Dovey Estuary, Cardiganshire, we saw a large bird approaching from mid-estuary. When it came level with us, at about 200 yards range, it hung for two or three minutes flapping

heavily in one spot and we could see it was a large hawk, brown above and white underneath. As we watched it, it dived vertically into the estuary with a big splash and emerged immediately with a sizeable fish held head foremost in its left talon. This it carried slowly off up the estuary, eventually going to land on the Cardigan-shire side about three-quarters of a mile away. This according to G. C. S. Ingram seems to be the first definite record of an Osprey (*Pandion haliaetus*) for the county although H. E. Forrest in his *Vertebrate Fauna of North Wales* (1907) mentions a report of one seen "hawking over the Dovey Estuary in 1905."

WILLIAM M. CONDRY AND HAROLD E. WRIGHT.

CALL OF GREAT WHITE HERON.

IN *British Birds*, vol. xli, p. 350, Mr. Paige records the note of the Great White Heron (*Egretta a. alba*).

During the first two months of 1949 I was staying at the delta of the River Tjitarum, near the north coast of W. Java, where the East-Asiatic form of this heron, *Egretta alba modesta*, proved to be of quite common occurrence, which gave me the opportunity of hearing the call rather often.

At times, especially if several individuals were together, the birds were rather noisy, the call invariably being harsh and strong and best described as "Grààâr." It is heard from birds standing as well as in flight. From Mr. Paige's note I understand that this must be the same noise as mentioned by him. In fact the voice is rather different from that of the other genera of herons known to me. The closely related Lesser Egret (*Egretta intermedia*), however, appears to have about the same note.

G. F. MEES.

MUTE SWAN'S METHOD OF BREAKING ICE.

ON November 25th, 1948, at dawn, a pair of Mute Swans (*Cygnus olor*) was feeding in a small area of open water on a gravel pit at Lt. Paxton, Hunts, the rest of the pit being thinly frozen over. To extend their feeding range the following actions were performed by one of the pair. Near the edge of the ice the neck was stretched forward and the head thrust under water, then a considerable wave was caused by the bird arching up the front part of its body and plunging it back into the water. This was repeated a number of times and effectively broke up the ice, when feeding in the new area at once started.

C. F. TEBBUTT.

DISPLAY OF TEAL.

AT Clarendon Lake, Wiltshire, on January 15th, 1949, I watched drake Teal (*Anas crecca*) displaying as described under Posture 4 (as for Mallard) in *The Handbook*. Head and tail were thrown up at the same time, so that they nearly, but not quite, met, the feathers of the head being puffed out and the bill depressed. It occurred

while several drakes were swimming around in circles, a few females also being present, and was not followed by any further activities.

R. WHITLOCK.

CORMORANT DRYING WINGS ON WATER

ON August 11th, 1948, at Durleigh reservoir, near Bridgwater, Somerset, I was surprised to see a Cormorant (*Phalacrocorax carbo*) with its wings extended in typical drying attitude while resting on the water. It remained in this position for about a minute, after which it flew to a partly submerged tree stump and continued to dry its wings in the more typical manner. It does not appear that the above has been previously recorded.

E. G. RICHARDS.

GREAT SHEARWATERS IN THE SKAGERAK IN EARLY JUNE.

ON June 10th, 1948, H.M.S. Devonshire was steering a course of 095 through the Skagerak.

Between 0700 and 1700 B.S.T., five Great Shearwaters (*Puffinus gravis*) were observed passing quite close to this ship flying westwards. The typical shearwater build was obvious, and the black cap, whitish cheeks, brownish upper-parts and white under-parts were all clearly seen. At the time, the ship was approximately in the position, 58°N, 9°E; the weather was clear with practically no wind.

This date seems to be very early, especially for these seas where this bird rarely occurs.

T. M. GULLICK.

[*The Handbook* records occurrences in British waters "on a fair number of occasions" in the second half of June. Duffey and Rankin record birds in the eastern North Atlantic on June 7th, and in an early season Wynne-Edwards "found them well distributed, though in small numbers, as far as 55°N. 30° 20' W. only 150 miles from Ireland," as early as May 31st, 1945 (*antea*, vol. xli, special supplement, pp. 11-12).—Eds.]

DUNLIN RESTING ON THE SEA AT HIGH TIDE.

ON February 2nd, 1949, while watching flocks of Dunlin (*Calidris alpina*) during high tide on the saltings at Canvey Point, Essex, I observed a flock of some 30 of these birds alight, for no apparent reason, on rough water some six yards from the shore.

The birds stayed on the water for quite a quarter-of-an-hour, before joining other Dunlin on the shore.

M. J. ARDLEY.

LITTLE STINT WINTERING IN SOMERSET.

ON January 9th, 1949, we saw a Little Stint (*Calidris minuta*) on Dunster beach with a flock of Sanderling (*Crocethia alba*). At first we thought it might be a Dunlin (*Calidris alpina*), but at close range we noted the following points:—Very small size as compared

with the Sanderling, a shortish straight bill, and very white breast and under-parts. In flight it showed a rather faint white wing-bar.

We saw a Little Stint with Dunlin at Porlock Marsh (about 5 miles west) on November 14th, 1948, so it is possible this was the same bird.

The only other wintering records for the county are one on February 10th, 1935 (*Brit. Birds*, xxviii, p. 351); and one on January 3rd, 1940, at Berrow.

A. V. CORNISH AND H. J. CRASKE.

BROAD-BILLED SANDPIPER IN SUFFOLK.

On September 19th, 1948, we were on the North Suffolk coast just below Walberswick. Our attention was drawn to two birds flying in with purposeful flight and a call which was entirely new to both of us. The call was vaguely similar to the trill of a Dunlin, (*Calidris alpina*) though rather more highly pitched, more musical, and with shorter units. Flying, they called very regularly, and, after circling, settled on the mud of Corporation Marshes, where they at once ran very agilely out of sight into low cover.

We were able to cross to this part, and found them standing motionless by a Sea-Aster, one with its bill tucked into its wing. By a careful approach we came within eight yards of them, and obtained excellent views through binoculars and a 20 x telescope, with a lowering sun shining brightly over our shoulders. We alarmed them, and one hesitantly walked in a crouching attitude behind some grass, bobbing its head nervously. The other followed in similar fashion and they both stood peering over this clump of herbage. When we moved, they ran quickly away from cover to cover until they were on the edge of a pool. As they ran, they would stretch their necks a little from the usual hunched attitude; but the moment they stopped, they once more regained the appearance of having no neck. We flushed them and they headed straight away, first low, then high, calling until right out of sight.

The birds were about Dunlin size or slightly smaller. One was much more rufous than the other and appeared very colourful against its drab companion. However, as they both had the same essential characteristics, we have described the bright bird; and toned down considerably, this applies in almost every detail to the dull one.

They were dark squat birds of a plumpish aspect. At first sight they had no striking markings, but on closer examination the following points were noted. The bill was rather slender, tapering and decurved slightly, black at the tip, shading to dark chestnut-red at the base (olive in dull bird). The legs, rather on the short side, appeared yellowish green.

The forehead and crown were dark (blackish and rufous) with a narrow whitish line passing through the borders of the dark area. Sides of face and ear-coverts greyish, darker round eye. The breast was strongly speckled and striped with brown, getting lighter and

paler towards the throat and chin. This shading merged round the sides of the neck with similar shading on the hind neck. The hind neck markings coarsened into the mantle, back and wings, which were quite rich on the bright bird. The feathers appeared dark brown, suffused with rufous, and with light buffish edgings. About level with the shoulder, these edges were aligned in the form of a "V" when seen from behind. A less noticeable bar was visible lower down the back. In the closed wing the primaries appeared brownish black and the wing-coverts and secondaries had pale buff edges. Many of the wing-coverts showed a very rich, almost chestnut colouring. Belly white. In flight no bar of any description could be seen on the wing, but the white under-parts extended up to the sides of the rump as in a Dunlin.

In view of this, we identified both these birds as Broad-billed Sandpipers (*Limicola falcinellus*).

DENNIS FELSTEAD AND P. H. GAMBLE.

LITTLE RINGED PLOVER NESTING IN SUSSEX.

ON May 10th, 1949, I took Mr. T. C. Fooks to an area eminently likely to hold Little Ringed Plovers (*Charadrius dubius*), which I was unable to visit in 1948. A bird was there seen, and Fooks quickly found its nest with four eggs, which we duly inscribed with our initials in indelible pencil.

On May 14th, I, together with the Rev. J. and Mr. A. G. Wootton and Mr. J. Ferguson Lees, again visited the spot and found the nest still intact. Elsewhere we observed three, if not four, more Little Ringed Plovers, finding, too, several "scrapes."

On the 17th and 20th Fooks went there alone and reported the nest safe on both dates. On the former date he met with three birds in the area where they were seen on the 14th, and, on the latter, a pair there which had a "scrape" with one egg. On the 25th he and I again visited the haunt. The nest with one egg on the 20th now contained four (which we blue-pencilled); while the other nest was still in being.

I am practically certain that the above area is where Messrs. James and Alder came across a pair in the spring and summer of 1948, though breeding was not then proved.

JOHN WALPOLE-BOND.

LITTLE RINGED PLOVER IN DEVON.

ON April 3rd, 1949, beside a watercourse entering on to the Exe Estuary, I noticed at long range a bird which I took at the time to be a migrating Ringed Plover (*Charadrius hiaticula*).

On April 10th, in company with my daughter, I again noticed the bird in the same area but much nearer, and as Ringed Plover do not frequent this part of the estuary at this time of the year, we approached to within twenty yards and with x10 glasses the following points were noted :—Yellowish orbital ring around the eye, greenish

yellow legs, white forehead with black band behind it, white stripe behind the eye with inconspicuous continuation over the head behind the black band, brown crown, a thick black line from the bill through the eye, upper-parts lightish brown, under-parts white, white collar, black pectoral band much wider at the sides than in the centre, bill dark with a small pale spot at the back of the lower mandible. The bird was clearly a Little Ringed Plover (*Charadrius dubius*) and was then flushed, when the absence of any wing-bar gave additional confirmation. The note on rising was a sharp "cheou-it" and on one occasion "cheou."

On April 11th the bird was examined by my friend Mr. R. G. Adams who confirmed the identification:—dark beak, yellow eye ring and completely brown wing, and also heard the note which he rendered as "chu-eet" and noted the size as hardly larger in body than an adjoining Pied Wagtail (*Motacilla alba yarellii*). The bird was seen again on April 12th, 1949, for the last time. I cannot trace any previous record of the Little Ringed Plover in Devon.

F. R. SMITH.

KENTISH PLOVER WINTERING IN EAST KENT

ON December 29th, 1948, a Kentish Plover (*Leucopoliuss alexandrinus*) was observed by Mr. D. P. W. McCarthy and myself at Pegwell Bay, Kent. It was associating with three Ringed Plover (*Charadrius hiaticula*) and about forty Dunlin (*Calidris alpina*), but the plovers remained for some minutes after the Dunlin flew and when the Ringed Plover eventually flew the Kentish Plover remained for several more minutes. When feeding in association with the Ringed Plover it kept out of their reach, racing away whenever a Ringed Plover made towards it. It was observed with x 6 and x 10 binoculars under good light conditions at about 80 yards. It was smaller than the Ringed Plovers, with blackish or very dark legs and bill and no pectoral band, only dusky patches on each side of the throat.

LAURENS SARGENT.

ON January 30th, 1949, soon after mid-day, my wife and I were watching the large flock of mixed waders that were congregated just above high tide mark in an area of the Sandwich Flats. We were each taking cover behind separate sand-dunes, and recorded independently the presence of a single Kentish Plover (*Leucopoliuss alexandrinus*) among a flock of eighteen Ringed Plover (*Charadrius hiaticula*) and two Dunlin (*Calidris alpina*). The bird was very obviously smaller than its companions and this first drew attention to it. Coupled with this the general colour of its back was a shade lighter than that of the Ringed Plovers, and might be described as ashy-brown. The forehead was narrowly white and a whitish stripe continued from this over the eye. A dark stripe ran from the bill through the eye and faded out at the neck, which with the nape, throat, breast and under-parts was white. There were darkish brown patches on either side of the breast. The bill was

short and black and the legs appeared blackish. The crown showed no black whatsoever. We therefore concluded that it was a female or a first winter bird.

In flight the bird was observed to have a slight whitish wing-bar. The tail pattern was not closely observed, but it left the impression of being rather dull in comparison with the pattern of the tails of its companions, the Ringed Plovers.

Observation was made in good light, the sun shining from behind us ; x 6 and 7 x 50 binoculars were used at 40 yards.

On February 13th in company with Messrs. L. Wilson and W. Robinson, we were again able to obtain good views of this bird, which we watched for about an hour, in the same area as the previous record.

VICTOR C. W. LEWIS.

TERN MIGRATION IN SOUTH STAFFORDSHIRE IN AUTUMN.

On September 16th, 1947, I visited Bellfields Reservoir in South Staffordshire, arriving there about 12.30 p.m. (G.M.T.) after a heavy downpour of rain which had lasted nearly all the morning. A large flock of at least a hundred terns was wheeling fairly high over the water. Of this flock about twenty were Black Terns (*Chlidonias niger*) in winter or juvenile plumage. The remainder were either Common (*Sterna hirundo*) or Arctic Terns (*S. macrura*). The birds were in almost incessant motion and too distant to make distinction between the last two species possible, but I feel they were most probably Common Terns. My impression was that the flock had only just arrived since it swooped down to the water and began to loosen up. A great proportion wheeled into the western end of the reservoir where I followed them. For the next three-quarters of an hour the flock wheeled up and down this portion of the reservoir, at times becoming compact again ; at others breaking up when some individuals began to make fishing dives. Whenever the flock was thus loosened up, the Black Terns commenced "fishing" rather apart from the others, but were swept up into the flock when it reformed. About 1.45 p.m. the flock, exclusive of the Black Terns, moved towards the eastern end of the reservoir and very rapidly settled on a spit. This and their subsequent behaviour suggested that the restless movement of the birds was an attempt to find a suitable spot at which to settle. The settling on the spit just mentioned took place while my back was towards the birds for some minutes, and my subsequent turning unintentionally caused the whole flock to rise at once. The birds then attempted to settle on an adjacent projection of the shore, but since the first individuals about to land were driven off by two Black-headed Gulls (*Larus ridibundus*) already settled there, this attempt was given up. For a further hour the birds continued an incessant wheeling about, at times rising and becoming more compact and twice disappearing completely towards the west, only to re-appear and descend towards

the water. When I left about 2.45 p.m. the birds were still moving about in an unsettled manner.

Two hours later I reached Aqualate Mere some eight miles north-west of Bellfields Reservoir. Here also there were Common (or Arctic) Terns. During my short stay, eight or ten were generally in view, individual birds were only low over the lake for a few minutes and then disappeared along the outlet of the lake at its western end. For about one minute, six Common (or Arctic) and two Black Terns perched on some wooden stakes which projected over the waters of the lake.

I think it probable that the birds seen at Aqualate were components of the large flock seen earlier at Bellfields. However these observations clearly indicate movement of terns in a westward direction, probably from the Trent into the Severn valley (the outlet stream of Aqualate Mere drains indirectly into the Severn).

E. O. HÖHN.

[Attention has previously been drawn (*antea*, Vol. iv, p. 105, Vol. xvii, p. 139) to the strategic position of the Staffordshire reservoirs as a link between the Trent and the Severn. Published observations of migratory movements seem, however, to be rather scanty, and to the best of our knowledge there is no record from Bellfields of so large a flock of terns as that seen by Mr. Höhn.—EDS.]

ICELAND GULL IN NORFOLK.

ON January 18th, 1949, when on Cley beach I saw an adult Iceland Gull (*Larus glaucoides*) flying west just above the sea very close in shore. It had no black in its wings. I had a good view of it for a long distance through my Zeiss field-glasses.

Its flight was light and graceful on slender wings, and its bill was not noticeably heavy. It was flying close behind two Common Gulls (*L. canus*) and I was thus able to judge of its size in comparison with them, which in my mind left no possibility of its being the larger and heavier Glaucous Gull (*L. hyperboreus*).

JUDITH M. FERRIER.

[In view of the attention recently drawn to the over-emphasis formerly laid on the wing-length in separating Iceland from small Glaucous Gulls (*vide antea*, vol. xl, pp. 369-373) carefully authenticated records of Iceland Gulls will be welcomed. It is worth noting that Mr. G. T. Kay informs us that Iceland Gulls were more frequent round Shetland in 1948-9 than usual, while Glaucous Gulls, which were present at Lerwick in considerable numbers in recent winters, were scarce.—EDS.]

WAXWING INVASION, 1948-9. Many observers have already sent us details of Waxwings (*Bombicilla garrulus*) seen during last winter, most of them in the early part of 1949. A summary is being prepared, and any further records should be sent to the Assistant Editor without delay.

PASSAGE OF BLACK TERNS IN 1949.—It is evident that there was a small passage of Black Terns (*Chlidonius niger*) in the first half of May, 1949. Records received so far do not justify a long report, but it is possible that they do not indicate the full scale of the movement. Readers who have not yet reported on this passage are invited to do so.

5-SEP-1949
RECEIVED

LETTER

MALLARD MORTALITIES

To the Editors of BRITISH BIRDS.

SIRS,—A consideration of the data set forth by Mr. Höhn (*antea*, Vol. xli, pp. 233-235) leads me to two conclusions : (a) there is a simpler way of showing decline of mortality with increasing age, and (b) that Höhn's method of drawing his conclusion is questionable. The table below sets out the needful figures in numbered columns. In column 1 are given the age-specific mortalities derived from part D of Höhn's table. The figures are the percentages the losses in any year bear to the number exposed to risk at the beginning of the year. Although high mortality persists through the second year of life it is only half as great in the third and fourth years. Evidently the sample is still insufficient, since ringed adults are shown to have exceeded ten years of age.

As to my second conclusion, we assume that a fair sample of adults, at ringing, would be composed of age groups whose numbers would be those derived from a series of annual hatches of young having the mortalities given in my column 1, and which have reached at least one year of age at ringing. The age composition of a thousand such birds is given by column 2. This population shows percentage losses, based on the original number, as given in column 3. Application of the chi-square test to a comparison of my figures and Höhn's (column 4) shows that the chance of his part A and my column 3 differing only by chance is much less than 1 in 100. We conclude that the population of part A is not derived from one with the mortality characteristics of part D. Inclusion of any birds less than one year old in the adult ringing would only make matters worse. It can also be shown by direct calculation that it is not possible to derive a population that shows the losses given in part A from any assortment of birds having the age-specific mortalities of my column 1. In column 5 I show a combination which will yield the losses of part A, but the mortality of second year birds must be reduced to 78.3%.

CHARLES H. BLAKE.

TABLE.

Years of life			1	2	3	4	5
1st	...	...	89.0%				
2nd	87.0%	802	80.1%	65.3%	581
3rd	41.6%	103	10.4%	23.9%	103
4th	42.9%	59	6.0%	6.6%	280
5th	100.0%	36	3.5%	4.2%	36

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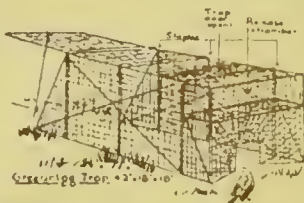
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BRITISH BIRDS

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NOTES ON FULMARS AND OTHER BIRDS IN THE SOUTHERN NORTH SEA IN THE MONTH OF MAY.

BY

POUL JESPERSEN (Copenhagen.).

DURING a cruise on board the Danish Research Ship, "Dana", in the southern North Sea in May, 1948, I had the opportunity to make ornithological observations. According to the experience gained during numerous cruises I have found that the avian life can be studied more intensively in the open sea from a research vessel, which often lies still in order to make investigations, than from a passenger boat or a cargo steamer which covers a certain distance without making any stops on her route. It might therefore be of interest to record the most important observations made.

The investigated area extended across the North Sea between 54° and 56° Lat. N., and the investigations were made in two different periods. From May 6th to May 13th a section was made across the North Sea from Esbjerg on the west coast of Jutland to a point off Longstone Lighthouse, and from there southwards along the east coast of England to a point off Whitby, whence another section was made across the North Sea to Heligoland Bay and from there northwards to the waters off Esbjerg. The other cruise which started from Esbjerg lasted from May 19th to May 28th and went as far as the Dogger Bank and the areas of the North Sea situated east of the Dogger Bank.

It was of special interest to ascertain that the Fulmar (*Fulmarus glacialis*) occurred in fairly considerable numbers in the southern North Sea at this season. The species was seen daily throughout the investigated part of the North Sea where the "Dana" sailed, except the southeasternmost and easternmost areas, i.e., in the Bay of Heligoland and the waters right off Esbjerg. In the latter area the species was not observed until about 60 miles from land. Along the English coast from Longstone Lighthouse to Whitby Fulmars were seen, although sparsely, on the whole route, which is fairly natural, as there are several breeding colonies here (cf. Fisher and Waterston, 1941, p.225). It was more surprising, however, to meet considerable numbers of Fulmars over the more central areas of the North Sea. When the "Dana" sailed only a few Fulmars (often only 3 or 4) were generally seen, but when we were lying still in order to fish a considerable number of birds would generally gather round the ship. During the cruises across the North Sea in the days from May 6th to May 13th we stopped at intervals of 20 miles, but only for short stays in order to collect

plankton and make hydrographic investigations, but these stops did not attract the Fulmars in any degree worthy of mention. During the later cruise in the days from May 19th to May 28th we fished, however, with trawl and Danish seine-net, which involved stoppage for several hours, in some places for more than twelve hours, in the same locality, and then a considerable number of Fulmars would often gather quite close to the ship. On the chart are plotted the positions for the stations at which we fished in the days from May 19th to May 28th, and the figures here indicate the greatest number of Fulmars which could be counted round the ship during the fishing. When two figures are given for some stations the upper one shows the maximum number in the afternoon, and the lower one the maximum number in the morning of the next day. The chart clearly shows that we had by far the greatest number in the area round the Dogger Bank, where for several days we could count 60-80 Fulmars round the ship. In the eastern part of the North Sea the number of Fulmars was, however, considerably smaller.

It is rather surprising to meet Fulmars in abundance in the open southern North Sea in the latter half of May, at which time egg-laying is normally in progress. In the northern Atlantic a fairly great number of these birds may also, as will be known, be seen in the middle of the breeding-season. Thus Wynne-Edwards (1935, p. 274) estimated that some 20 per cent of Fulmars remained at large in the North Atlantic throughout the breeding-season, and Richter (1937, p. 193) is of the opinion that only one-third to two-fifths of Fulmars which are actually present at a Scottish breeding colony appear to be engaged in reproduction. As an explanation of this fact Wynne-Edwards later (1939, p. 127) advances the hypothesis that the Fulmars do not breed annually, but only at longer intervals. This probably explains the occurrence in the southern North Sea of the great numbers of Fulmars during the breeding-season.

Throughout the Dogger Bank area Fulmars were highly dominant in numbers as compared with other sea-birds. The next common birds were the Kittiwake (*Rissa tridactyla*) and the Lesser Black-backed Gull (*Larus fuscus*), but they were everywhere less abundant than Fulmars. In the case of the Kittiwake, as in that of the Fulmar, the greatest numbers were in the area round Dogger Bank, particularly in its most westerly part, the maximum number seen on any one occasion being fifteen. The Lesser Black-backed Gull, on the other hand, seemed to be more evenly distributed over the investigated part of the North Sea. One bird, the Gannet (*Sula bassana*), was seen only once and then only a single specimen on the northwestern side of Dogger Bank, on May 25th, during the weeks which we spent in the North Sea. Of other sea birds an adult Great Skua (*Stercorarius skua*) should be mentioned; it was seen on May 13th about 60 miles west of Jutland (about 55° 38' N., 6° 23' E.).

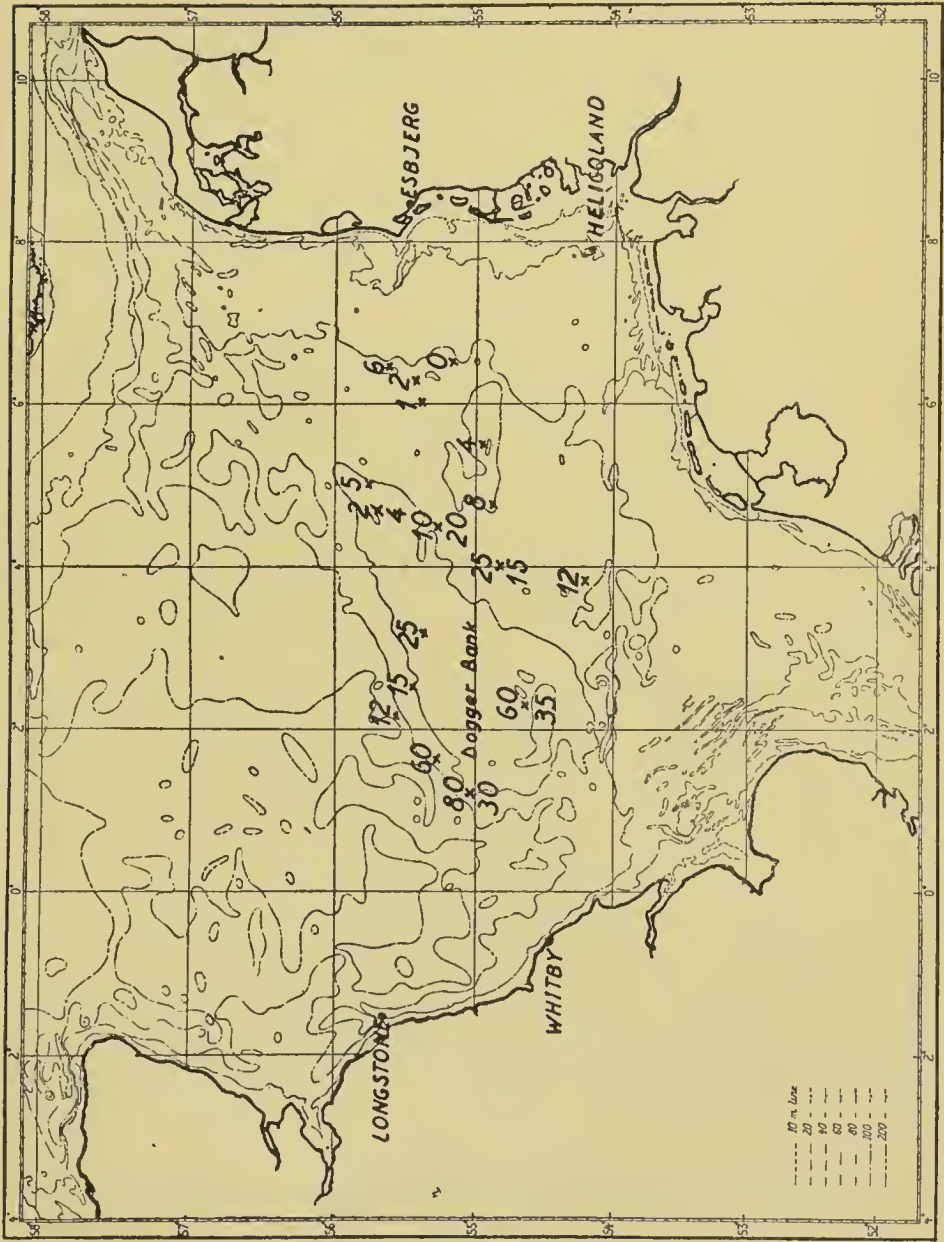
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THE MAXIMUM NUMBERS OF FULMARS OBSERVED IN THE NORTH SEA FROM
MAY 19TH TO MAY 28TH, 1948.

THE YOUNG GANNET

BY

G. T. KAY

WE are well acquainted with the young Gannet (*Sula bassana*) from the day of its birth until the day when it takes to the sea, but little seems to be known of its activities during the following two or three weeks. From being a fat ungainly creature, quite unable to fly (as I have learned), it has to transform itself into a powerful flier and a slim, expert diver, before it can secure its first meal. How does it do it?

The Handbook informs us that the young bird, after being fed by its parents for two months, is left by them to starve for about ten days, when it flies down to the sea and drifts about for two or three weeks before beginning to feed for itself. After studying Gannets intensively for six months at Noss, Shetland, Mr. R. Perry states (*The Scotsman*, October 26th, 1946) that the parents stop feeding the young bird at the nest and the young bird, after a period of starvation, flies down to the sea, thus doing the actual deserting, as its parent or parents remain by the nest for some weeks later. On no occasion had Mr. Perry seen a young bird being fed on the water by an adult. Mr. Dugald Macintyre presents quite a different picture by asserting (same issue of *The Scotsman*) that he had actually seen young Gannets being fed on the water by old ones and that it was an annual occurrence to see "young grey Gannets in closest pursuit of individual old ones, screeching for food all the time." This he had seen at Machrihanish Bay and near Ailsa Craig.

Living only a few miles from the island of Noss, I felt that I ought to know something of this subject and determined to spend a few days in the vicinity of the colony during the period when the young birds take to the sea. Accordingly, in 1947, I spent three days on this quest (August 24th and 27th and September 12th), and in 1948 a further four days (August 16th, 20th and 28th and September 7th). On each of those dates I cruised in my boat over an area approximately 20 to 25 sq. miles immediately east, south-east and south of the Noss colony. On October 7th, 1948, a further visit was paid to the colony without, however, cruising off shore. These investigations were conducted in all sorts of weather from calm to gale and much of interest was noted.

Two thousand individuals would be a conservative estimate of the number of young Gannets getting to the sea from Noss. The period of their departure from the ledges may be roughly stated as the last three weeks in August and the first three in September, although stragglers may be found into October. It if were the case that the young birds simply drifted about for two or three weeks after getting to the sea, it would be reasonable to expect to find, about the beginning of September, in the area I have described, a large gathering of birds on the water. The facts were very different. On one occasion

only was there found an average of more than one bird to the square mile (24 birds in 20 square miles), the average being considerably less on the other occasions. Except when the wind was strong from between east and south, young birds were found thus widely spaced out over the sea surface and all deliberately paddling towards the south-east and away from the land. By overtaking these birds I established to my satisfaction that, although fully feathered, none of them could fly; that is, none of them had the ability to get on the wing from off the sea. Even with a gale of wind they were quite unable to get up from off the tops of the waves. On being closely approached they flapped over the surface for about a dozen yards, then collapsed on the water and rounded on the boat with beak in the air and mouth wide open, uttering a strident call somewhat similar to that of the adult. Such was the procedure on every occasion. It was obvious that the birds were in fat condition and the wobbly nature of the flapping indicated that the wing muscles were not sufficiently developed to get the heavy bird off the water. Periodically the birds interrupted their swimming to exercise their wings, thus continuing a practice commenced some time before leaving the nesting ledges.

There seemed to be something significant in the deliberate nature of the bird's swimming. Invariably it was in a south-easterly or south-south-easterly direction. The furthest away of the birds found by me was seven miles from the land, but fishermen reported others further off and all heading in the same direction. A bird was reported plodding along as early as August 11th, 1948, twelve miles south-east from the colony. On three occasions with wind strong from the south-east and south, no young birds were found in the above area, but, on one of the occasions, three birds were found as far as seven miles to leeward of the area. Either the birds do not come down with such conditions or the few that do are unable to get to windward. It is doubtful that a young Gannet could swim for very long against a gale with breaking seas. That this bulky and buoyant young bird gets into difficulties with a gale is evident from the fact that (Lockley, 1942) on September 18th, 1935, after a gale from the south-south-west, on a stretch of two miles of the Pembrokeshire coast, five young Gannets were found dead amongst other birds which had been washed up. There can be no doubt as to the danger of being caught down on a leeshore. By their purposeful swimming to the south-east the young birds from Noss are instinctively doing a sensible thing—getting away from the land. This movement to the southward is possibly the first trace of the birds' response to that migratory urge which is known to be stronger in the young bird than in the adult. Whatever the reason, the youngster is drawn out to the open sea and safety at a period in its life history when it is unable to fly.

While standing by individual birds (in the boat), at a reasonable distance, I have found that, with moderate weather, they swim off

shore at a speed of from half to three quarters of a mile per hour. It can thus be seen that, by paddling alone, a considerable mileage is covered by the young bird in the matter of a few days. This fact clears up the local puzzle as to why there are no first year birds in company with the many adults which yearly, in September and October, are seen diving in the vicinity of Lerwick. Clearly they have gone from Shetland coastal waters before getting on the wing. Thus over a period of from six to eight weeks, the young Gannets from Noss glide or fly down from their nesting ledges to the sea and "flow" away from the land in a widespread "stream" out over the southern horizon.

A striking feature of the young birds' passage to the open sea is the fact that no notice whatever is taken of them by the numerous adults flying over their heads to and from the colony. Neither on the above dates nor on any other occasion have I seen a young Gannet being fed on the water by an adult, nor have fishermen whom I have questioned. Certainly none of those "young grey Gannets" were physically able to get in "closest pursuit of old ones." It would be very astonishing if adult birds, which had lost the feeding urge ten days or so before the young ones went to sea, should regain the urge when the young bird had become an ever receding speck on the wide ocean.

On September 12th, 1947, and again on September 7th, 1948, a large proportion of the young birds had left the nesting ledges but there were still "full houses" of adults. I should say that on those dates there were certainly as many adults at the nests as at any time during the breeding season. Again on October 7th, 1948, when only two young birds could be detected on the ledges, there seemed to be no diminution in the number of adults. Eagle Clarke (*Studies in Bird Migration*), found Gannets "crowding the ledges" at St. Kilda on October 8th, 1910, and on October 12th, 1911. Undoubtedly the nesting area has a strong attraction for the adult bird long after the young one has departed. It seems fantastic to suggest that any of those parents could have had the slightest interest in, or have had the faintest knowledge of the whereabouts of, young birds which had left their nests up to two months earlier and could well have been over a hundred miles away. Indeed a bird ringed as a nestling at Grassholm on June 9th, 1939, was recovered 600 miles south of the colony as early as August 23rd, of the same year.

So far my evidence seems to indicate a certain pattern of events, but reference must now be made to evidence, given to me on excellent authority, which at first glance seems to upset this pattern, but which I believe has a perfectly sound explanation. Gannets, described as adult, have been seen to fly south past Flamborough Head in considerable numbers during the month of August (exact dates not given, but probably during the last week) and many of them were followed, "as with a shadow," by young birds of the year. In view of my experiences in Shetland waters, I do not for

one moment believe that those young birds were following parents. If my evidence and that of others is worth anything, the parents of those young birds would still have been at their nesting stations at the end of August. If this flight was a migratory movement, as seems to be indicated, then it is extremely unlikely that any breeding adult took part in it. Dr. A. Landsborough Thomson (*British Birds*, Vol. xxxii, p. 282) in his review of ringing recoveries, demonstrates that there is a marked contrast between the definite migration southwards of the younger birds to West European and North African waters and the later movement of the adult birds, which is more in the nature of a dispersal and scarcely takes them beyond southern home waters. Of particular interest here is the fact that the groups of non-breeders, which are features at certain parts of the Noss cliffs in the summer months, were absent on September 7th and October 7th, 1948. The departure dates of these birds may be judged from the statement by Mr. Perry (*Shetland Sanctuary*, pp. 222-224) that few noticeably immature birds were seen at Noss after the end of July and that there was a marked decrease in non-breeders in August, few of them remaining into the first days of September. From the above evidence it seems reasonable to suggest that southerly movements of Gannets past Flamborough Head in late August are likely to be composed of immature birds of different ages and non-breeders, rather than of breeding adults followed by young birds of the year.

To sum up, it seems clear to me that after the young Gannet has got to the sea, it is completely on its own. It is no longer fed by its parents and its only concern is to get away from the land and develop itself for an active life on the wing. It leaves the nest in fat condition and is thus able to sustain itself for many days without food. The time duly arrives, however, when, having developed its wings and lost its fat, it is able to get up, first for short flights and then for longer ones until strong on the wing. Exactly how it secures its first meal may never be known, but not a great deal is left to the imagination. Either it must dive on fish instinctively when alone or follow the example of older birds with which it is certain to come in contact. The conspicuous plumage of the older birds is probably of value to the young one in enabling it to pick out feeding birds at a distance.

In conclusion it may be stressed that the foregoing observations apply to an area within which the young Gannet does not appear to get on the wing. It would be of much interest to have the observations of any reader who may have witnessed any activity of the young bird in more southern waters. Migratory movements passing headlands such as Flamborough Head and Dungeness in August and September must be of much interest.

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RECOVERY OF MARKED BIRDS.

COMMUNICATED BY

E. P. LEACH.

*Hon. Sec., Bird-Ringing Committee, British Trust for Ornithology.***Carrion Crow** (*Corvus corone*).

<i>No.</i>	<i>Ringed.</i>	<i>Recovered.</i>
327696	Kirkland (Cumb.), 10.6.46, young, by R. H. Brown.	Clappersgate (Westmor.), —.7.48 [26 m. S.W.].

Rook (*Corvus frugilegus*).

RINGED AS YOUNG

334868	Ackworth (Yorks.), 2.5.48, by Ackworth School.	Ouseburn (Yorks.), 6.3.49 [28 m. N.].
334403	Hook Norton (Oxon.), 20.4.48, by A. Darlington	Stonehouse (Glos.), 14.4.49 [40 m. S.W.].

Jackdaw (*Corvus monedula*)

RINGED AS YOUNG.

335408	Andreas, I. of Man, 7.6.48, by Cowin, Crellin and Ladds.	Braddan, I. of Man, —.3.49 [13 m. S.].
RW.1630	Canterbury (Kent), 17.6.48, by St. Edmund's Sch.	Wittersham (Kent), 12.12.48 [25 m. S.S.W.].

Starling (*Sturnus vulgaris*).

RINGED AS YOUNG.

T.1061	Rogart (Suth.), 24.5.48, by R. Carrick.	Brabster (Caithness), 10.11.48 [55 m. N.E.].
X.3461	Sibford Ferris (Oxon.), 17.5.48, by A. Darlington.	Amersham (Bucks), 22.7.48 [40 m. S.E.].

RINGED AS FULL-GROWN.

SK.37	Fair Isle Bird Obs., 24.10.48.	Fraserburgh (Aberdeen), 24.3.49.
T.2719	Edinburgh, 2.3.48, by Midlothian O.C.	Horncliffe (Northumb.), —.12.48 [45 m. S.E.].
T.2897	Ditto 6.3.48	Gedsted (Jylland), Denmark, 22.3.49.
V.4185	Kilmarnock (Ayr), 11.1.48, by F. Walls.	Elgin (Moray), 15.9.48 [150 m. N.N.E.].
V.9618	Ditto 20.6.48	Belfast, Ireland, 29.12.48.
12051	Ballantrae (Ayr), 6.2.49, by Nelson and Stevenson.	Monaghan, Ireland, 12.4.49.
X.2226	Seaham (Durham), 13.3.47, by R. Murray.	Elmham (Norfolk), 5.5.49 [175 m. S.E.].
WL.940	Thornton - le - Dale (Yorks.), 3.1.46, by R. M. Garnett.	Wadworth (Yorks.), —.12.48 [57 m. S.S.W.].
TN.165	Ackworth (Yorks.), 18.2.40, by A. Darlington.	Heligoland, Germany, 23.3.42.
WR.431	York, 6.3.39, by School.	Bootham Forshem (Skaraborg), Sweden Date uncertain.
SE.698	Ditto 19.12.47	Ekeby (Östergötland), Swe- den, 30.3.49.
V.8984	Ditto 7.3.48	Fullerup (Fyn), Denmark, 13.7.48.
V.8963	Ditto 3.3.48	Amsterdam, Holland, 15.8.48.
V.8885	Ditto 10.2.48	Blankenberghe, West Flan- ders, 29.10.48.

No.	Ringed.	Recovered.
WP.82	Askham Bryan (Yorks.), 14.2.47, by R. Carrick.	Flensburg, Schleswig- Holstein, 11.8.48.
X.1409	Leeds (Yorks.), 6.3.47, by R. Carrick.	Wallasey (Ches.), 26.1.49 [65 m. S.W.].
X.1561	Ditto 15.3.47	Nijenga (Friesland), Holland, 29.7.48.
WP.161	Ditto 21.2.47	Meppel (Drenthe), Holland, 30.6.48.
V.5631	Huddersfield (Yorks.), 16.10.48, by N. Sykes.	Liverpool (Lancs.), 25.2.49 [50 m. W.S.W.].
X.2802	Cleveleys (Lancs.), 30.1.47, by R. M. Band.	Ilkley (Yorks.), 11.8.48 [52 m. E.].
V.7408	Ditto 23.1.48	Birstall (Yorks.), 6.5.48 [58 m. E.S.E.].
X.2810	Ditto 2.2.47	Mexborough (Yorks.), 22.2.49 [75 m. E.S.E.].
V.7364	Ditto 16.1.48	Copenhagen, Denmark, 15.3.49.
V.4400	Ditto 18.11.47	Jyllinge (Sjælland), Denmark, 28.3.49.
V.4635	Flixton (Lancs.), 14.12.47, by A. E. Male.	Rushden (Northants), 6.2.49 [115 m. S.E.].
X.5783	Douglas, I. of Man, 1.1.48, by Cowin, Crellin and Ladds.	Wakefield (Yorks.), 18.8.48.
V.7249	Sale (Ches.), 18.12.47, by J. Southern.	Thorne (Yorks.), 1.6.48 [58 m. E.N.E.].
V.7280	Ditto 11.1.48	Malbork, Poland, 3.3.49 (formerly Marienburg, E. Prussia).
WP.515	Ditto 1.2.47	Sölvesborg (Blekinge), Sweden, 21.3.49.
T.7267	Birkenhead (Ches.), 26.11.48, by W. Rankin and Birkenhead Sch.	Bingley (Yorks.), 15.3.49 [60 m. N.E.].
V.7956	Ditto 17.2.48	Crossgates (Yorks.), 6.6.48 [70 m. N.E.].
12265	West Bridgford (Notts.), 1.1.49, W. Rankin	Blaricum, Noord Holland, 16.5.49.
WT254	West Bromwich (Staffs.), 7.3.47, by D. R. Mirams.	Widnes (Lancs.), 28.2.49 [65 m. N.W.].
11207	Holyhead, Anglesey, 29.10.48, by C. P. Rawcliffe.	Clitheroe (Lancs.), 13.5.49 [100 m. N.E.].
11217	Ditto 1.11.48	Wigan (Lancs.), 18.5.49 [83 m. N.E.].
WR.2	Ettington (Warwicks.), 10.3.39, by C. A. Norris	Glückstadt, Schleswig- Holstein, —.8.41.
TT.412	Ware (Herts.), 17.2.47, by C. B. Wainwright.	Ringsted (Sjælland), Den- mark, 18.8.48.
V.8162	Iwerne Minster (Dorset), 26.2.48, by Claysmore Sch.	St. Dogmaels (Pembs.), 25.12.48 [132 m. N.W.].

Bullfinch (*Pyrrhula pyrrhula*).

B.1730	Shrewsbury (Salop), 19.6.48, young, by Shrewsbury Sch.	Wellington (Salop), 17.4.49 [11 m. E.].
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Chaffinch (*Fringilla cælebs*).

C.V.185	Andreas, I. of Man, ad., 25.12.45, by Cowin, Crellin and Ladds	Ervik, Sunnfjord, Norway, 24.4.49.
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No. Ringed. Recovered.

Meadow-Pipit (*Anthus pratensis*).

Private Mark Skokholm (Pem.), 2.8.48, young, Bilbao (Vizcaya), Spain,
by J. Buxton. 24.10.48.

Grey Wagtail (*Motacilla cinerea*).

B.8807 Fenwick (Ayr), 14.5.48, young, Lichfield (Staffs.), 21.11.48
by F. Walls. [225 m. S.E.].

Pied Wagtail (*Motacilla alba yarrellii*).

RINGED AS FULL-GROWN.

BC.245 Halifax (Yorks.), 19.8.48, by Biarritz (B.-P.), France,
Halifax Zool. Group. 15.10.48.

C.6108 Ditto 10.8.48 Ilhavo, N. Portugal, —.1.49.

Great Tit (*Parus major*).

C.1711 Honiton (Devon), 1.9.48, by Budleigh Salterton (Devon),
Oxford O.S. 4.12.48 [14 m. S.S.W.].

Blue Tit (*Parus cæruleus*).

RINGED AS YOUNG.

D.1500 Wytham (Berks.), —.5.48, by Chadlington (Oxon.), 6.10.48,
Edward Grey Inst. [13 m. N.W.].

C.1948 Ditto —.5.48 Sibford Ferris (Oxon.),
26.11.48 [20 m. N.N.W.].

Red-backed Shrike (*Lanius collurio*).

T.4636 Lyndhurst (Hants.), 22.6.48, Winchelsea (Sussex), 30.7.48
young, by E. Cohen. [100 m. E.].

Spotted Flycatcher (*Muscicapa striata*).

Private Mark Coln Rogers (Glos.), 31.7.47, Bibury (Glos.), 21.5.49
young, by J. Buxton [4 m. S.].

Pied Flycatcher (*Muscicapa hypoleuca*)

RINGED AS YOUNG.

D.4269 Forest of Dean (Glos.), 1.6.48 Where ringed, 20.5.49.
by B. Campbell.

D.4321 Ditto 4.6.48 Ditto 20.5.49.

D.4424 Ditto 12.6.48 Biarritz (B.-P.) France, 6.10.48

RINGED AS FULL-GROWN.

B.6121 Forest of Dean (Glos.), 8.6.47 Where ringed, 5.6.48. 23.5.49.

D.4511 Ditto 21.6.48 Ditto 24.5.49.

Willow-Warbler (*Phylloscopus trochilus*).

RINGED AS FULL-GROWN.

A.8168 Isle of May Bird Obs., 24.7.48. Spurn Bird Obs., 8.8.48.

A.8160 Ditto 29.5.48 Llanfairfechan (Caerns.),
10.6.48 [210 m. S.S.W.].

Sedge-Warbler (*Acrocephalus schænobænus*).

B.5285 Bedford, 14.7.48, young, by Greenford (Middx.), 31.8.48
H. Southon. [44 m. S.].

Whitethroat (*Sylvia communis*).

A.7193 Skokholm Bird Obs., ad., 14.5.48. Mirandela, N. Portugal,
1.10.48.

No.

Ringed.

Recovered.

Song-Thrush (*Turdus ericetorum*).

RINGED AS YOUNG.

- V.5159 Apperley Bridge (Yorks.), Huddersfield (Yorks.), 27.2.49
14.5.48, by R. F. Dickens. [16 m. S.]
- N.5487 Bryanston (Dorset), 31.5.48, by Bridport (Dorset), 17.4.49
Bryanston Sch. [27 m. S.W.]
- T.6515 Camberley (Surrey), 6.7.48, by Betchworth (Surrey), 11.10.48
R.M.A. Orn. Soc. [22 m. E.S.E.].

Ring-Ouzel (*Turdus torquatus*).

- SH.504 Hebden Bridge (Yorks.), 11.5.46, Iciar (Guipuzcoa), Spain
young, by E. Watson. 21.3.48.

Blackbird (*Turdus merula*).

RINGED AS YOUNG.

- SJ.40 Winestead (E. Yorks.), 17.5.48, Hull (Yorks.), 28.3.49 [15 m.
by H. Bunce. W.]
- SB.403 Wimbledon, London, 13.5.45, Brest (Finistère), France,
by Lond. N.H.S. 25.1.49.

RINGED AS FULL-GROWN.

- SK.546 Avoch (Ross.), 2.3.46, by J. Lees Starheim, Nordfjord, Norway,
13.1.49
- XL.282 I. of May Bird Obs., 22.10.47 Florö, W. Norway, 17.9.48.
- XL.439 Ditto 30.10.48 Varhaug (Jaeren), Norway,
5.5.49.
- N.9141 Spurn Bird Obs., 15.11.47 Kvaas, S. Norway, 18.7.48.
- WT.624 Douglas, I. of Man, 16.3.47, by Middleton - in - Teesdale,
H. M. Rogers (Durham), 4.8.48.
- 11219 Holyhead, Anglesey, 6.11.48, by Broughton - in - Furness
C. P. Rawcliffe. (Lancs.), 6.3.49. [90 m.
N.E.]

Wheatear (*Enanthe ænanthe*).

RINGED AS YOUNG.

- CV.96 Fair Isle Bird Obs., 16.7.48 Bragança, Portugal, 20.9.48.
- B.1083 Sabden (Lancs.), 28.6.48, by Cap Ferret (Gironde), France,
J. J. Boon. 30.8.48.
- Private Mark* Skokholm (Pem.) 31.5.48, by Coventry (Warwicks.), 10.4.49.
J. Buxton.

Robin (*Erithacus rubecula*).

- A.8318 I. of May Bird Obs., ad., 30.10.48 Coaltown of Wemyss (Fife),
19.12.48. [23 m. W.]

Swallow (*Hirundo rustica*).

RINGED AS YOUNG.

- B.9246 Cumdivock (Cumb.), 16.8.47, by Wigton (Cumb.), 25.6.48.
R. H. Brown. [5 m. W.]
- CW.256 Sabden (Lancs.), 14.8.46, by Pendleton (Lancs.), 12.5.49.
J. J. Boon. [2 m. N.W.]
- CP.316 Great Budworth (Ches.), 26.6.47, Where ringed, 25.6.48.
by A. W. Boyd.
- B.3411 Bradwell-on-Sea (Essex), 22.6.47, Walton - on - the - Naze
by Lond. N.H.S. (Essex), 28.7.48. [17 m.
N.E.]

No.	Ringed.		Recovered.	
RINGED AS FULL-GROWN.				
DS.897	South Cheriton (Somerset), 13.6.48, by E. D. Knight.	Where	ringed,	8.6.49.
House-Martin (<i>Delichon urbica</i>).				
A.7993	Sabden (Lancs.), 31.7.47, young, by J. J. Boon.	Where	ringed,	21.6.48.
Nightjar (<i>Caprimulgus europæus</i>).				
H.7053	Bristol, 16.7.47, young, by A. E. Billett.	Casteljaloux (Lot-et-Garonne), France,	3.10.48.	
Cuckoo (<i>Cuculus canorus</i>).				
233075	Stafford, 26.7.48, young, by A. H. Johnson.	Loos (Pas-de-Calais), France,	10.10.48.	
Little Owl (<i>Athene noctua</i>)				
320507	Byland (Yorks.), 26.5.40, young, by Bootham Sch.	Upsall (Yorks.), 24.7.48.	26.10.41, [6 m. W.]	
Short-eared Owl (<i>Asio flammeus</i>).				
AN.4669	Barr (Ayr), 6.5.48, young, by G. Hughes-Onslow.	Pateley Bridge (Yorks.), 10.8.48.	[140 m. S.E.]	
Barn-Owl (<i>Tyto alba</i>).				
305859	West Lavington (Wilts.), 10.2.47, ad., by Dauntsey's Sch.	Llangeview (Mon.), [48 m. N.W.]	16.9.48.	
Merlin (<i>Falco columbarius</i>).				
329245	Hawthorn Moor (Yorks.), 22.6.47, young, by R. F. Dickens.	Rotherham (Yorks.), [36 m. S.S.E.]	—, 12.48.	
Kestrel (<i>Falco tinnunculus</i>)				
RINGED AS YOUNG.				
336051	St. John's, I. of Man, 11.7.48, by Cowin, Crellin and Ladds.	Grayrigg (Westmor.), —, 5.49.		
336625	Loughborough (Leics.), 14.7.48, by H. A. Clements.	Irthlingborough (Northants), 20.10.48.	[40 m. S.E.]	
334048	Richmond (Surrey), 15.6.48, by Lond. N.H.S.	Dorking (Surrey), [15 m. S.]	4.8.48.	
Buzzard (<i>Buteo buteo</i>).				
AB.9711	Scourie (Suth.), 10.6.48, young, by I. Appleyard.	Inverpollly (Ross.), [20 m. S.]	25.1.49.	
Hen-Harrier (<i>Circus cyaneus</i>)				
RINGED AS YOUNG.				
AD 4641	Orkney, 11.7.47, by E. Balfour.	Where	ringed,	5.4.49.
AN 6667	Ditto	15.7.48	Thrumster (Caithness), 8.10.48.	[48 m. S.]

No.

Ringed.

Recovered.

Heron (*Ardea cinerea*).

RINGED AS YOUNG.

506304	Tongue (Suth.), 23.4.48, by I. Pennie.	Laurencekirk (Kincardine), 1.8.48. [135 m. S.E.]
502682	Eaton Hall (Ches.), 27.4.41, by J. F. Stirling.	Chirk (Denbigh), 10.5.49. [16 m. S.S.W.]
505544	High Halstow (Kent), 1.6.48, by D. Goodwin.	Hatfield Peverel (Essex), 6.3.49. [23 m. N.]
505025	Ditto	1.6.48 Richborough (Kent), 18.7.48. [35 m. S.E.]
505526	Ditto	1.6.48 River (Kent), 14.7.48, [36 m. S.E.]
505540	Ditto	1.6.48 Stanwell Moor (Middx.), 14.7.48. [46 m. W.]

White-fronted Goose (*Anser albifrons*).

128041	Slimbridge (Glos.), 18.2.48, ad., by P. Scott.	Saffetingen (Z e e l a n d), Holland, 7.1.49.
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Mallard (*Anas platyrhyncha*).

RINGED AS FULL-GROWN.

RINGS ISSUED TO WILDFOWL INQUIRY COMMITTEE.

926490	Slimbridge (Glos.), 8.11.48	Bedford, 27.12.48. [85 m. E.N.E.]
926000	Ditto	13.2.48 Hemdrup (Jylland), Denmark, 1.8.48.
926006	Ditto	18.11.47 B a k h u i z e n (Friesland), Holland, 23.8.48.
926438	Ditto	22.8.48 Estuary of Vire (Manche), France, 20.10.48.

RINGS OF ORIELTON DECOY.

4661	Pembroke,	3.11.47 Bravik (Östergötland), Sweden, 11.8.48.
4679	Ditto	20.12.47 Ringkjöbing (Jylland), Denmark, 10.9.48.

Teal (*Anas crecca*).

RINGED AS FULL-GROWN.

RINGS ISSUED TO WILDFOWL INQUIRY COMMITTEE.

904521	Pembroke,	26.12.46 Banbridge (Down), 5.2.49.
904577	Ditto	31.12.46 Reaghstown (Louth), 27.2.49.
904775	Ditto	20.10.47 Castlereagh (Roscommon), 28.2.49.
904877	Ditto	7.11.47 Birr (Kings Co.), 7.2.49.
904027	Ditto	9.12.46 Cappoquin (Waterford), 17.2.49.
903911	Ditto	2.12.46 Templemore (Tipperary), 3.2.49.
902699	Ditto	5.11.45 Limerick, 8.9.48.
904903	Ditto	9.11.47 Kuru, Finland, 24.8.48. [61° 50'N; 23° 45'E.]
903254	Ditto	5.1.46 Herning (Jylland), Denmark, 2.10.48.
902285	Ditto	13.2.39 Klinte (Fyn), Denmark, autumn, 1948.
902164	Ditto	7.1.39 Föhr, N. Frisian Is. —10.42.

No.	Ringed.	Recovered.
901484	Pembroke,	5.12.38 Pinneberg (Schleswig-Holstein), Germany, 16.7.41.
902751	Ditto	22.11.45 Eisenach (Thuringia), Germany, 14.3.49.
904511	Ditto	26.12.46 Kampen (Overijssel), Holland, 7.10.48.
904309	Ditto	19.12.46 Ditto 1.10.48.
902861	Ditto	1.12.45 Moerdijk (N. Brabant), Holland, 21.9.48.
904866	Ditto	5.11.47 Le Cateau (Nord), France, 5.9.48.
904527	Ditto	27.12.46 Berck (Pas-de-Calais), France, 25.8.48.
905011	Ditto	1.12.47 Carentan (Manche), France, 10.1.49.
904924	Ditto	12.11.47 Arrembécourt (Aube), France, 25.8.48.
903947	Ditto	4.12.46 Ostheim (Alsace), France, 8.12.48.
904718	Ditto	23.9.47 Aigues Mortes (Gard), France, 20.10.48.
902567	Abbotsbury (Dorset),	24.1.46 Archangel, Russia, 17.5.48.
902552	Ditto	23.1.46 Pskov, Russia, —4.48.
907033	Borough Fen (Northants),	3.2.49 Flisa (Solör), Norway, 22.4.49.
906559	Boarstall (Bucks.),	5.3.48 Berck (Pas-de-Calais), France, 10.8.48.

Wigeon (*Anas penelope*).

RINGED AS FULL-GROWN.

RINGS ISSUED TO WILDFOWL INQUIRY COMMITTEE.

906380	Slimbridge (Glos.),	22.3.48 Luleå (Norrbotten), Sweden, 1.10.48.
906402	Ditto	23.3.48 Limfjord (Jylland), Denmark, 12.10.48.

RINGS OF ORIELTON DECOY.

4509	Pembroke	21.12.46 Sverdlovsk (formerly Ekaterinburg), Russia, 7.5.48.
4476	Ditto	11.2.46 Sterlitamak, Russia, 28.4.48. [53° 59'N; 55° 58'E.]
4485	Ditto	31.3.46 Vologda, Russia, 25.7.48.
4474	Ditto	30.1.46 Väddö, East Sweden, 23.9.48. [59° 59'N; 18° 44'E.]

Pintail (*Anas acuta*).

RINGED AS FULL-GROWN.

RINGS ISSUED TO WILDFOWL INQUIRY COMMITTEE..

925406	Abbotsbury (Dorset),	8.2.47 Chuya, Central Russia, 19.4.48, [56°43'N.; 41°23'E.]
905299	Ditto	9.12.48 Zoutkamp (Groningen), Holland, 15.1.49.
926508	Slimbridge (Glos.),	18.9.48 Claremorris (Mayo), 14.11.48.

RINGS OF ORIELTON DECOY.

3697	Pembroke	19.12.38 Archangel, Russia, 28.4.47.
4577	Ditto	31.1.47 Bassin d' Arcachon (Gironde), France, 30.1.49.

No.

Ringed.

Recovered.

Shoveler (*Spatula clypeata*).

RINGED AS FULL-GROWN.

RINGS ISSUED TO WILDFOWL INQUIRY COMMITTEE.

906415	Slimbridge (Glos.),	15.11.47	Duncormick (Wexford), 18.8.48.
906421	Ditto	19.9.48	Alkmaar, Noord, Holland, 24.4.49 (Nesting).
904167	Ditto (transported Berkshire feather-cut.)	16.11.47	Chateau Renault (Indre-et-Loire), France, 20.9.48.
Or. 4023	Pembroke	18.2.39	Mouth of Elbe, Germany, 24.8.40.

Cormorant (*Phalacrocorax carbo*).

RINGED AS YOUNG.

113917	Mochrum (Wigtown), by Lord Bute.	30.6.35,	Rockcliffe Marsh (Cumb.), 24.7.48, [65 m. E.]
126006	Farne Is. (Northumb.), by R. Carrick.	19.7.39	Berwick-on-Tweed, —.4.49.
506464	Ditto 23.7.48, by Ash & Ridley		Doddington (Ches.), 26.11.48, [185 m. S.S.W.]
128403	Maughold Hd., I. of Man 5.7.48, by Cowin, Crellin & Ladds.		Carentec (Finistère), France, 4.10.48.
125931	Tenby (Pem.), Skokholm Bird Obs.	18.7.47, by	Cherbourg (Manche), France, 1.11.48.
125919	Ditto	18.7.47	Noya (Galicia), Spain, 22.11.47
128261	Great Saltee I. (Wexford), 30.4.48, by I. Goodbody		Betanzos River (Galicia), Spain, —.11.48.

Shag (*Phalacrocorax aristotelis*).

RINGED AS YOUNG.

127441	St. Kilda, 17.7.48, by J. Fisher		Tarbert, Harris, 10.4.49.
506335	Farne Is. (Northumb.), by Ash & Ridley	23.7.48,	North Sea, 16.2.49 [54° 16' N.; 7 11' E.]
128385	Maughold Hd., I. of Man, by Cowin, Crellin & Ladds.	5.7.48	Stranraer (Wigtown), 4.1.49.
128311	Ditto	10.6.48	Cardross (Dumbarton), 13.11.48.
127488	Ditto	27.7.47	Tarbert, Loch Fyne (Argyll), 23.1.49.
127988	Ditto	31.7.47	Ballykinler (Down), —.2.49.
128393	Ditto	5.7.48	Sheephaven (Donegal), 2.2.49.
126546	Calf of Man	18.5.41	Kirkmichael, I. of Man, 8.2.49, [18 m. N.].
127088	Great Saltee Is. (Wexford), 28.5.47, by J. Weaving.		Fairbourne (Merioneth), 17.4.49.
126653	Lundy Bird Obs.	3.7.48	Esbjerg (Jylland), Denmark, 22.9.48.
126622	Ditto	19.7.48	L'Abervrach (Finistère), France,—10.48, St. Pol. (Finistère), —.1.49.

No.

Ringed.

Recovered.

Gannet (*Sula bassana*).

RINGED AS YOUNG.

128181	Bass Rock, 10.7.48, by Midlothian O.C.	Atlantic Ocean, 8.10.48 [ca. 51°N. : 14°W.].
505364	Ditto	10.7.47 Baie de la Somme, France, 13.11.48.
505375	Ditto	10.7.48 Pointe de la Percée (Calvados), France, 4.10.48.
505429	Ditto	10.7.47 Port de la Nouvelle (Aude), France, 29.7.48.
505684	Ditto	10.7.48 Irun (Guipuzcoa), Spain, 28.9.48.
128210	Ditto	10.7.48 Ribadeo (Asturias), Spain, 29.11.48.
505598	Ditto	10.7.48 Off Oporto, Portugal, 27.11.48.
128218	Ditto	10.7.48 Off Sesimbra, Portugal, —.10.48.
128192	Ditto	10.7.48 Off C. St. Vincent, Portugal, 24.10.48.
505686	Ditto	10.7.48 Agadir, W. Morocco, 22.12.48.
506543	Ditto, 24.7.48, by Ash and Ridley.	Puentedeume (Galicia), Spain, 8.11.48.
503824	Grassholm, 8.7.46, by Skokholm Bird Obs.	Trondheim, Norway, 25.8.48.
504067	Ditto	8.7.46 La Panne, West Flanders, 10.10.48.
504061	Ditto	8.7.46 Flamanville (Manche), France, 22.8.48.
504001	Ditto	8.7.46 Ile d'Yeu (Vendée), France, 5.11.48.
504099	Ditto	8.7.46 Minizan (Landes), France, 7.9.48.
505741	Ditto	10.7.48 Luarca (Asturias), Spain, 23.9.48.
503643	Ditto	11.7.46 Candas (Asturias), Spain, 15.10.48.
504460	Ditto	10.7.48 Puerto de Vega (Asturias), Spain, 13.9.48.
503826	Ditto	8.7.46 Off Aveiro, Portugal, —.10, or —.11.46.
504201	Ditto	12.8.47 Off C. Blanco, W. Africa, 23.8.48.
505746	Ditto	10.7.48 Off Rio de Oro, W. Africa, 10.3.49.
503423	Big Scar (Wigtown), 11.8.45, by J. Crosthwaite.	Port Talbot (Glam.), 12.6.49.

RINGED AS FULL-GROWN.

504294	Grassholm, 12.8.47, by Skokholm Bird Obs.	North Sea, 3.10.48 [54°28'N. : 3°22'E.].
503752	Ditto	23.5.47 St. George's Channel, 7.6.48, [ca. 51°N. : 6°W.].

Manx Shearwater (*Puffinus puffinus*).

RINGED AS YOUNG.

02294	Skokholm Bird Obs.,	28.8.48.	Leigh (Lancs.), 5.9.48 [180 m. N.E.].
02585	Ditto	29.8.48	Cheltenham (Glos.), 5.9.48 [137 m. E.N.E.].

No.	Ringed.	Recovered.
03534	Skokholm Bird Obs., 2.9.48	Brinkworth (Wilts.), 7.9.48 [140 m. E.].
04032	Ditto 4.9.48	Ringstead Bay (Dorset), 10.9.48 [145 m. S.E.].
02933	Ditto 31.8.48	Verdun (Meuse), France, 7.9.48.
RINGED AS FULL-GROWN.		
AV.1818	Skokholm Bird Obs., 5.4.48	Off Ushant (Finistère), France, 3.9.48.
01718	Ditto 3.8.48	Ditto —.4.49.
AT.6644	Ditto 12.6.47	Baie d'Audierne (Finistère), France, 25.5.49.
AV.2326	Ditto 25.4.48	Ditto 25.5.49.
AT.9157	Ditto 25.8.47	La Baule (Loire Infre.), France, 19.7.48.
AV.2875	Ditto 25.5.48	At Sea, 2.5.49 [45° 12' N. : 1° 40' W.].
318567	Skomer (Pem.), 14.7.39, by W. A. Cadman.	Hossegor (Landes), France, Spring, 1941.
03091	Ditto, 27.8.48, by Skokholm Bird Obs.	Cudillero (Asturias), Spain, 26.9.48.

Wood-Pigeon (*Columba palumbus*).

RINGED AS YOUNG.

337301	Blagdon (Northumb.), 19.9.48, by Ash and Ridley.	Skelton (Yorks.), —.1.49, [46 m. S.E.].
328226	Andreas, I. of Man, 2.5.48, by Cowin, Crellin and Ladds.	Saughall (Ches.), 7.1.49.
332283	Bride, I. of Man, 29.5.48, by Cowin, Crellin and Ladds.	Antrim, 21.1.49.

Oyster-catcher (*Hæmatopus ostralegus*).

RINGED AS YOUNG.

334204	Rockcliffe Marsh (Cumb.), 24.7.48, by A. V. Millard.	Walney I. (Lancs.), —.4.49 [60 m. S.].
328979	Skokholm Bird Obs., 13.6.47.	Lorient (Morbihan), France, 6.1.49.

Lapwing (*Vanellus vanellus*).

RINGED AS YOUNG.

243542	Loch of Harray, Orkney, 27.5.48, by K. G. Spencer.	Doocastle (Mayo), 2.1.49.
245923	West Yorks. (near Clitheroe), 17.7.48, by G. K. Spencer.	Drumree (Meath), 16.2.49.

Common Sandpiper (*Actitis hypoleucos*).

XV.416	Aultbea (Ross.), 16.6.47, young, by P. A. Rayfield.	Biganos (Gironde), France, 5.5.48.
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Curlew (*Numenius arquata*).

L. 329956	Clitheroe (Lancs.), 19.7.47, young, by J. J. Boon.	Monamolin (Wexford), 28.12.48.
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Common Snipe (*Capella gallinago*).

V.7509	Aultbea (Ross.), 24.5.48, by P. A. Rayfield.	Waterford, 19.12.48.
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No. Ringed. Recovered.

Sandwich Tern (*Sterna sandvicensis*).

RINGED AS YOUNG.

239779	Isle of May Bird Obs., 25.7.48.	Tangier, Morocco, 27.12.48.
239785	Ditto 25.7.48	Loanda, Portuguese W. Africa, 27.11.48.
239422	Ditto 9.7.48	Benguela, Portuguese W. Africa, 22.10.48.
243171	Firth of Forth, 22.7.48, by Midlothian O.C.	Triaise (Vendée), France, 4.10.48.

Arctic Tern (*Sterna macrura*).

RINGED AS YOUNG.

XN.59	Point of Ayre, I. of Man, Where ringed, 3.7.38, by Manx F.C.	5.7.48.
XX.985	Ditto 5.7.38	Ditto 23.6.48.

Little Tern (*Sterna albifrons*).

HK.366	Rye (Sussex), 22.6.39, ad., by P. Hollom.	Pornic (Loire Infre), France, 24.8.48.
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Black-headed Gull (*Larus ridibundus*).

RINGED AS YOUNG.

335767	Rhosgoch (Radnor.), 20.6.48, by B. Campbell.	Shannonbridge (King's Co.), —.1.49.
331990	L. Carra (Mayo), 26.6.48, by I. Goodbody.	Athy (Kildare), 19.7.48 [105 m. S.E.].
331936	Ditto 21.6.48	Ballinadee (Cork), 16.8.48 [140 m. S.].
331930	Ditto 21.6.48	Ballybunion (Kerry), 4.8.48 [90 m. S.S.W.].

RINGED AS FULL-GROWN.

320528	St. James' Park, London, 30.1.47, by Lond. N.H.S.	Corby (Northants), 16.1.49, [74 m. N.N.W.].
325922 } 310816 }	Ditto 18.2.39	Where ringed 23.2.45.
332135	Ditto 27.2.48	Samsö, Denmark, —.6.48.
328586	Thames Embankment, London, 22.1.47, by London, N.H.S.	Middelfart (Fyn), Denmark, 3.7.48.
329644	Strood (Kent), 19.2.47, by P. A. Rayfield.	Vejen (Jylland), Denmark, 25.5.49.
		Vejle (Jylland), Denmark, —.8.48.

Common Gull (*Larus canus*).

321213	Iwerne Minster (Dorset), 16.2.47, imm., by Clayesmore Sch.	Värobacka (Halland), Sweden, 30.4.49.
RX.6833	Littleton Reservoir (Middlesex), 30.1.49, ad., by P. Hollom.	Öland, Sweden, 4.4.49.

Herring-Gull (*Larus argentatus*).

RINGED AS YOUNG.

AN.4105	Ord, I. of Skye, 10.7.48, by Midlothian O.C.	Inverlochty (Inverness), 14.9.48 [40 m. S.E.].
AN.5953	Peel, I. of Man, 13.7.48, by Cowin, Crellin and Ladds.	Kilkeel (Down), 4.10.48.
AN.1677	Lundy Bird Obs., 13.7.48.	R. Yealm (Devon), 5.6.49, [65 m. S.S.E.].

No.

Ringed.

Recovered.

Lesser Black-backed Gull (*Larus fuscus*).

RINGED AS YOUNG.

AB.9288	Isle of May Bird Obs.,	28.7.47.	Lisbon, Portugal,	27.6.48.
AB.9313	Ditto	4.7.48	Agadir, Morocco,	1.1.49.
AN.6187	Mochrum (Wigtown), by Lord D. Stuart.	10.7.48,	Off C. Vilaño (Galicia), Spain,	6.11.48.
AB.9051	Walney I. (Lancs),	25.6.38, by late H. W. Robinson.	Grange-over-Sands (Lancs.),	24.10.48 [16 m. N.E.].
AN.2338	Ditto,	9.7.47, by R. M. Band.	Oran, Algeria,	17.3.49.
AN.2626	Roeburndale (Lancs.), by R. M. Band.	20.7.48,	Coruña, Spain,	14.1.49.
AN.2548	Ditto	20.7.48	Espinho (Douro), Portugal,	31.10.48.
AN.2644	Ditto	20.7.48	Mira (Coimbra), Portugal,	19.11.48.
AN.3434	Steep Holm, Bristol Channel, 20.6.48, by A. E. Billett.		Oporto, Portugal,	4.12.48.
AN.4302	Skokholm Bird Obs.,	13.8.48.	Aveiro, Portugal,	10.10.48.
RINGED AS FULL-GROWN.				
AN.4322	Skokholm Bird Obs.,	10.9.48.	Valongo (Douro), Portugal,	—.11.48.
AN.2001	Ditto	16.9.47	Cape Roca, Portugal,	5.3.49.

Great Black-backed Gull (*Larus marinus*).

RINGED AS YOUNG.

402258	Skokholm Bird Obs.,	1.6.38.	Where ringed,	29.4.47.
402282	Ditto	23.6.48	Sellafield (Cumb.),	3.5.49.
			[200 m. N.].	

Kittiwake (*Rissa tridactyla*).

RINGED AS YOUNG.

334543	Farne Is. (Northumb.),	23.7.48,	Juist, E. Frisian Is.,	20.1.49.
	by Ash and Ridley.			
314378	Ditto, 1946, for late Mrs.		Port aux Basques, Newfound-	
	Hodgkin.		land,	26.11.48.
336202	Lundy, Bristol Channel,	12.7.48,	Lequeitio (Vizcaya),	Spain,
	by R. H. Poulding.		—.	10.48.

Razorbill (*Alca torda*).

RINGED AS YOUNG.

AT.8236	Skokholm Bird Obs.,	17.7.47	Bukn Fjord, Norway,	27.11.48.
AT.7508	Ditto	10.7.47	Kvitsøy, Stavanger, Norway,	8.10.48.
AT.8044	Ditto	20.7.47	Lyngør, S.E. Norway,	5.10.48.
AV.3627	Ditto	26.6.48	Moss, S. Norway,	14.11.48.
AC.1825	Ditto	22.7.37	Where ringed,	1.7.38.
AC.1593			Arcachon (Gironde), France	9.3.41.
AV.3757	Ditto	30.6.48	Bilbao (Vizcaya),	Spain,
			30.10.48.	
0392	Ditto	14.7.48	Villanueva y Geltru (Barce-	lona), Spain, 3.4.49.

RINGED AS FULL-GROWN.

AV.3784	Skokholm Bird Obs.,	29.6.48.	North Somercotes (Lincs.),	31.10.48.
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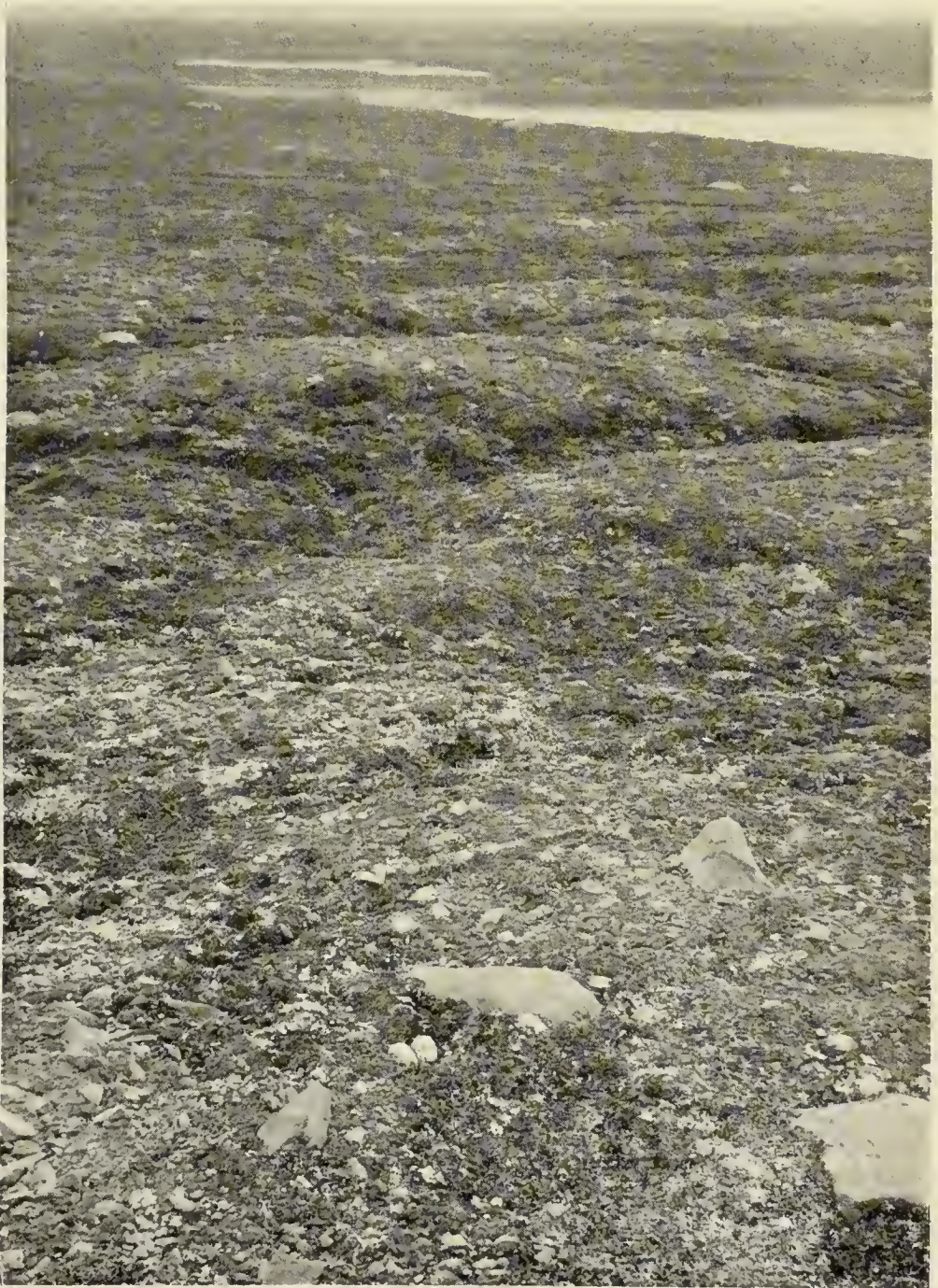
Ringed.

Recovered.

Common Guillemot (*Uria aalge*).

RINGED AS YOUNG.

AB.9339	Isle of May Bird Obs.,	25.7.48	Kvitsøy, Stavanger, Norway, 29.10.48.
AB.9328	Ditto	25.7.48	Arendal, S. Norway, 20.10.48.
AN.5113	Farne Is. (Northumb), by Ash and Ridley	23.7.48	Lindesnes, S. Norway, 16.1.49.
AN.5110	Ditto	23.7.48	Faerder, Oslo Fjord, Norway, 1.10.48.
AN.5112	Ditto	23.7.48	Ditto 24.10.48.
AN.5120	Ditto	23.7.48	Varberg (Halland), Sweden, 6.1.49.
AN.1621	Lundy Bird Obs.,	8.7.48.	Caparica, S. Portugal, —.2.49
AN.5677	Lundy, 9.7.48, by R.H. Poulding.		Ardscalpsie, I. of Bute,. 28.11.48.
AN.5395	Ditto	9.7.48	Mont St. Michel (Manche), France, 15.10.48.
AN.5723	Ditto	13.7.48	Roscoff (Finistère), France, 26.10.48.



KNOT (*Calidris canutus*).

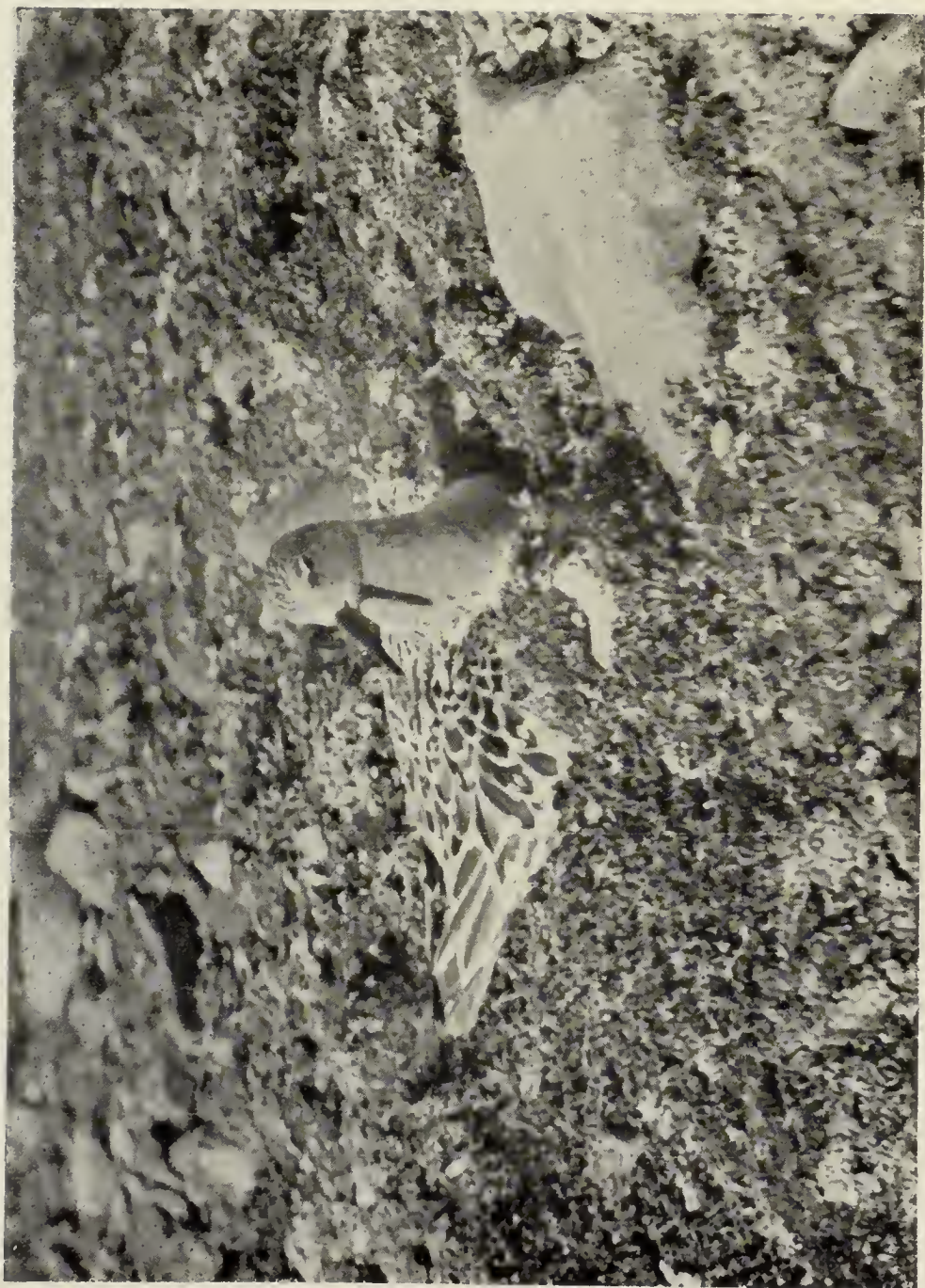
BREEDING GROUND, LIEFDE BAY, SPITSBERGEN, JULY 13TH, 1931, WITH
NEST AND EGGS IN FOREGROUND.

(Photographed by C. T. DALGETY).

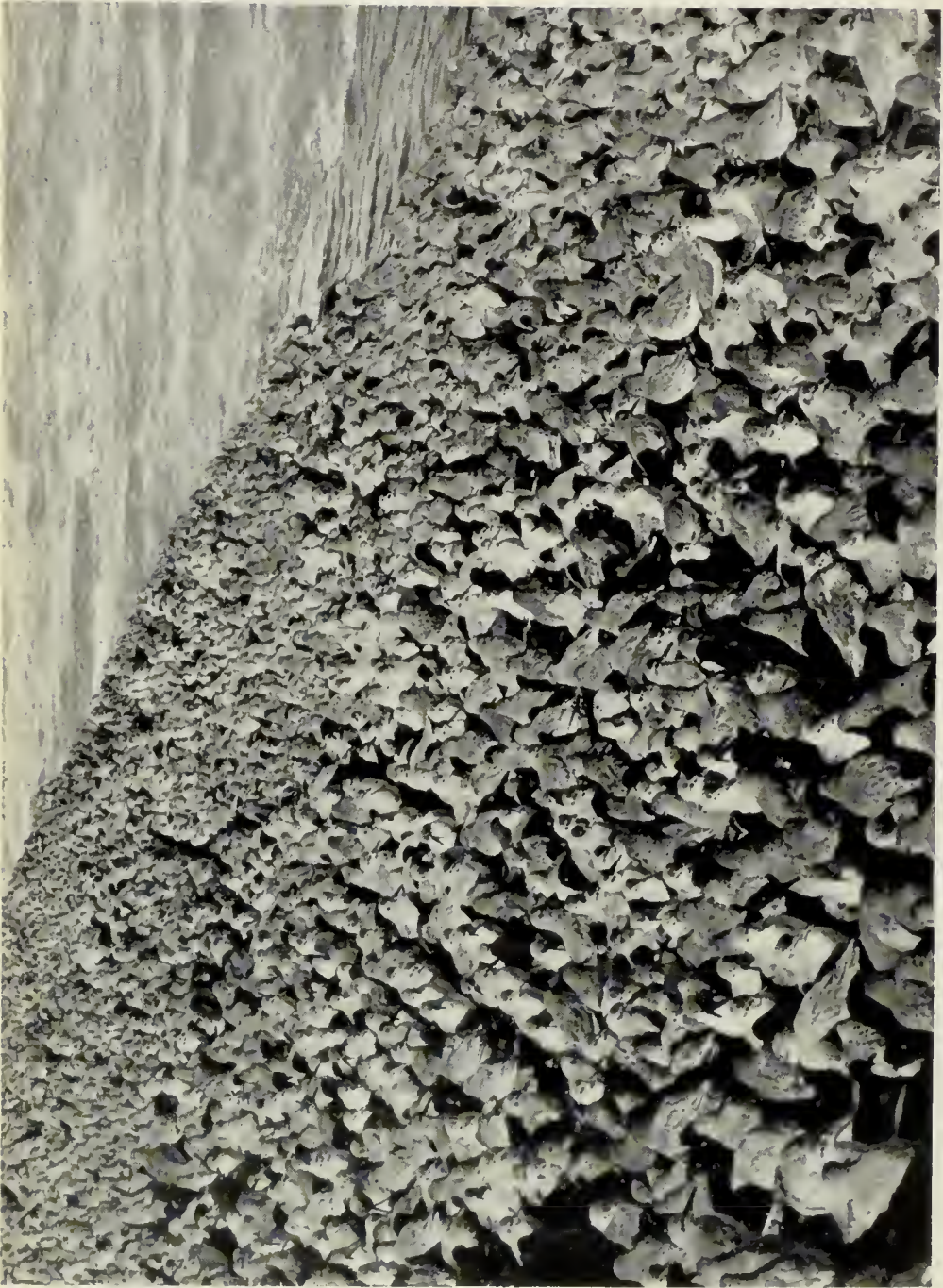


KNOT (*Calidris canutus*) ON NEST, LIEFDE BAY, SPITSBERGEN, JULY 13TH, 1931.

(Photographed by C. T. DALGETY).



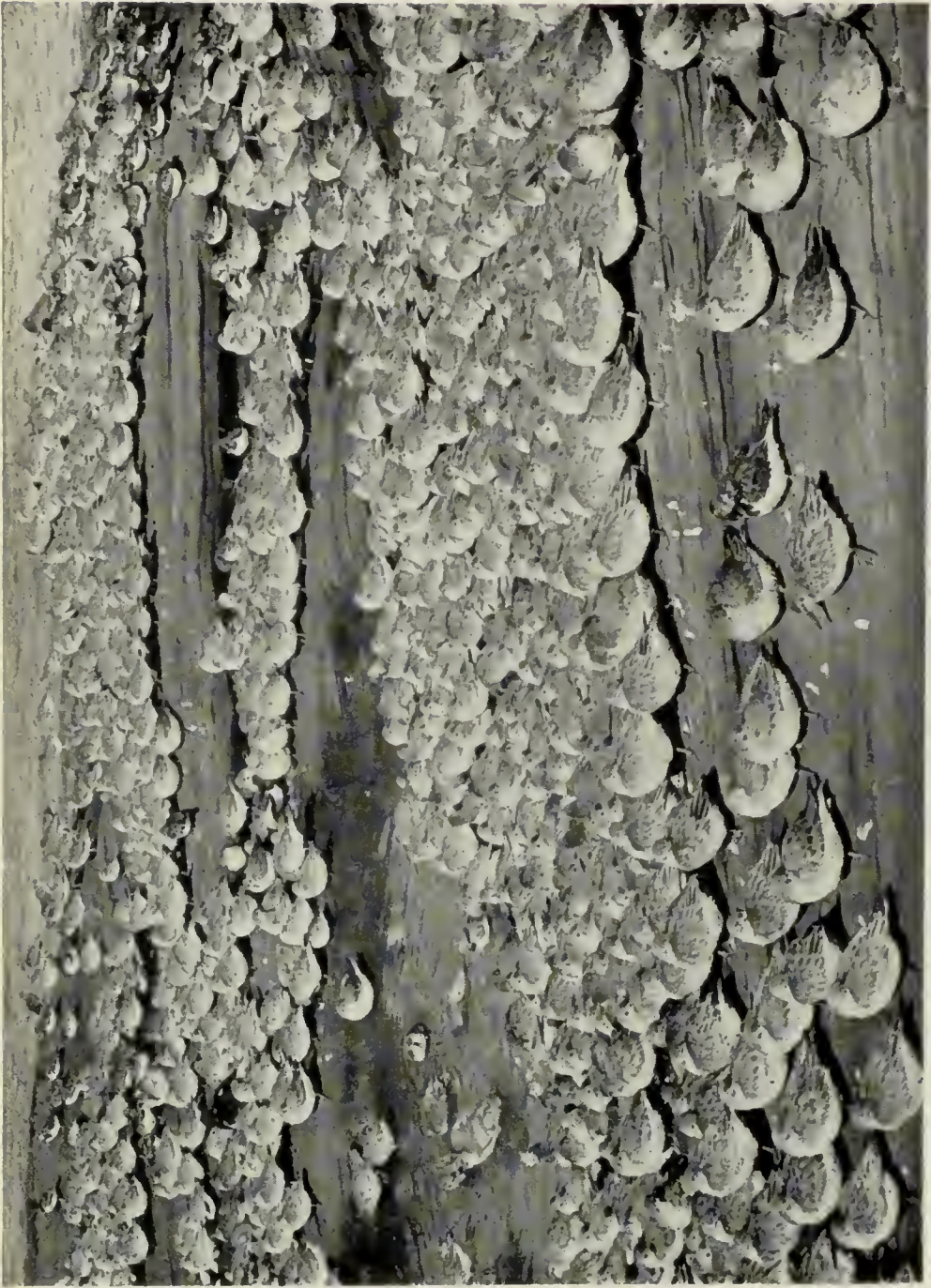
KNOT (*Calidris canutus*) ON NEST, LIEFDE BAY, SPITSBERGEN, JULY 13TH, 1931.
(Photographed by C. T. DALGETY).



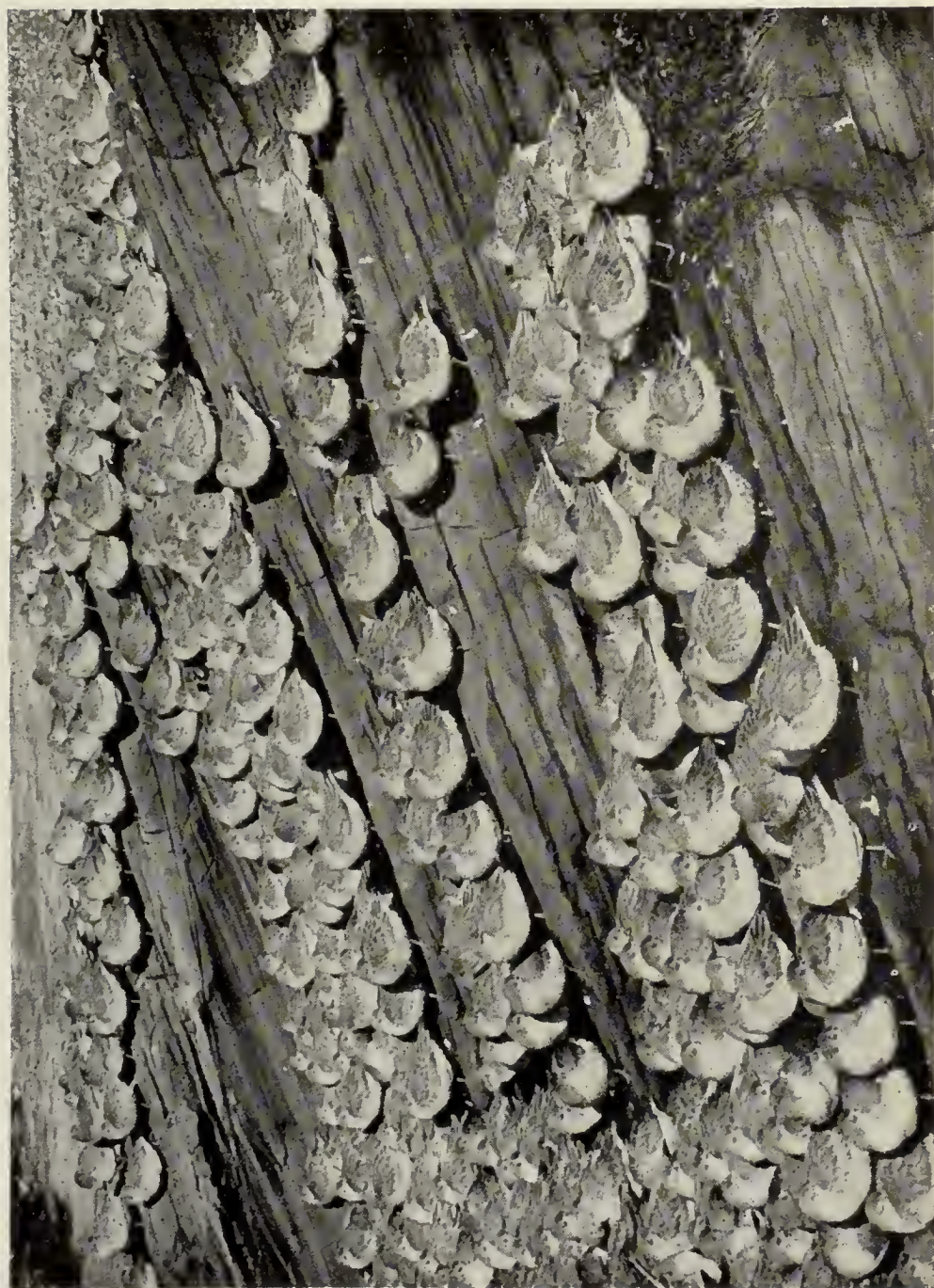
KNOTS (*Calidris canutus*) PACKING AT HIGH WATER, HILBRE ISLAND, CHESHIRE.
(Photographed by ERIC HOSKING).



KNOTS (*Calidris canutus*) PACKING AT HIGH WATER, HILBRE ISLAND, CHESHIRE.
(Photographed by ERIC HOSKING).



KNOT (*Calidris canutus*), WITH A FEW TURNSTONES (*Arenaria interpres*), HILBRE ISLAND, CHESHIRE.
(Photographed by ERIC HOSKING).



KNOT (*Calidris canutus*) AT HILBRE ISLAND, CHESHIRE.

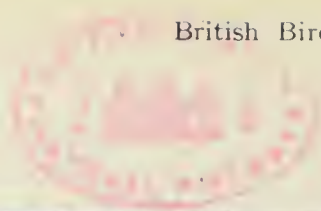
(Photographed by ERIC HOSKING).



KNOT (*Calidris canutus*) IN FLIGHT.
(Photographed by ERIC HOSKING).



KNOT (*Calidris canutus*) IN FLIGHT.
(Photographed by ERIC HOSKING).



KNOT (*Calidris canutus*). JUVENILE FEEDING ON SHORE, WEST COAST OF SWEDEN, SEPT., 1942.
(Photographed by OLOF SWANBERG).



UPPER.—KNOT (*Calidris canutus*).
NESTLING, REINDEER PENINSULA, SPITSBERGEN, JULY 13TH, 1930.
(Photographed by C. T. DALGETY).
LOWER.—HEAD OF LESSER WHITE-FRONTED GOOSE
(*Anser erythropus*) SHOT AT BREYDON, JAN. 24TH, 1949.
(Photographed by HAROLD DAVIES).



LESSER WHITE-FRONTED GOOSE (*Anser erythropus*) SHOT AT BREYDON, JAN. 24TH, 1949.
(Photographed by HAROLD DAVIES).

STUDIES OF SOME SPECIES RARELY PHOTOGRAPHED.

XXII. THE KNOT.

*Photographed by C. T. DALGETY, ERIC HOSKING
AND OLOF SWANBERG.*

(Plates 51-61).

IN the present issue we are again fortunate in being able to publish a unique series of photographs illustrating the main phases of the life of one of the northern waders familiar on our coasts outside the breeding season, namely the Knot (*Calidris canutus*). Most of the vast numbers of Knot which occur on the coasts of Western Europe breed in arctic Siberia (a distinct race, *C. c. rufa*, breeds in Greenland and arctic North America) and very few ornithologists have seen it nesting. A few, however, breed in Spitsbergen, where Mr. Dalgety's photographs were taken in 1931. Very barren and stony ground with the most meagre vegetation is usually selected for nesting.

Mr. Hosking's remarkable photographs showing Knot packing on Hilbre Island, near the mouth of the Dee, during the period of high water, afford a graphic illustration of the numbers in which this species occurs on our coasts from autumn to spring. Plates 58 and 59 show a flock in flight. They were taken in March of the present year.

Plate 60 shows a very successful study of a single bird of the year taken on the Swedish coast in autumn by Mr. Olof Swanberg, to whom we are already indebted for a number of excellent photographs of northern waders and other birds. The characteristic plumage pattern of the juvenile, with the whitish edgings to the feathers finely outlined on the inner side by blackish, in contrast to the more uniform winter plumage of the adults, is very well shown.

B.W.T.

NOTES ON VOICE AND DISPLAY OF THE JAY.

BY

DEREK GOODWIN

THE following observations on the voice and display of the Jay (*Garrulus glandarius*), whilst not to be considered fully comprehensive, seem worth recording in order to amplify the remarks in *The Handbook* on this subject. Most of the more detailed work has been with tame birds in confinement, but so far as possible all behaviour has been checked with wild birds and no notes have been included in the "innate" list without comment unless they have been heard from wild birds under circumstances that suggest that the correct interpretation has been put on their use by tame birds. As the sexes cannot be distinguished visually and no birds have been killed the terms "male" or "female" will be understood to refer with certainty only to tame specimens.

Owing to the fact that certain posturings are characteristically associated with certain notes it seems best to give a numerical list of the former and to save repetition by simply referring to these numbers in the section on voice.

POSTURING AND DISPLAY.

(1) Feathers of rump, upper tail-coverts, flanks, belly and (usually) crest and upper mantle erect; feathers of back and upper breast

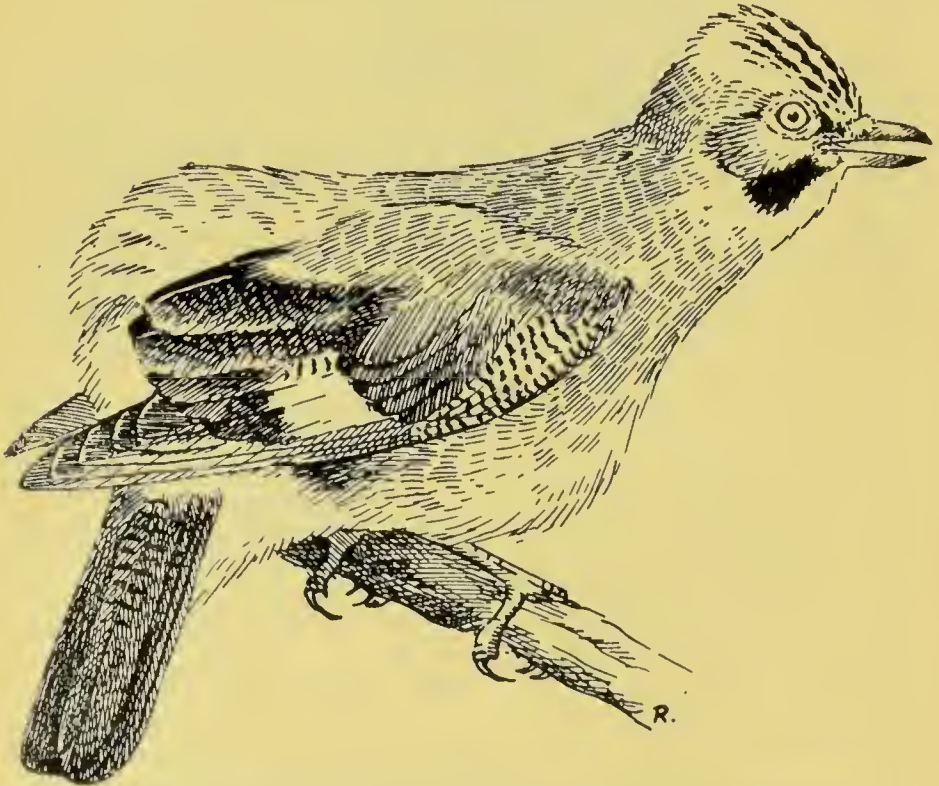


FIG. 1. MALE IN POSTURE 1, VERSION WITH CREST ONLY HALF-ERECT.

depressed. Wings slightly drooped, but tips usually above or on level with tail and primaries tightly folded, but secondaries slightly spread and usually with the black inner greater coverts drooping in such a way as to interpose a solid black patch between the blue wing-coverts and the (visible) white on the secondaries. The whole effect is to increase and accentuate the black and white area of the wing and to alter profoundly the bird's outline.

Used by male when in a state of sexual or aggressive excitement. In many cases it seems to be the outcome of any more or less generalized excitement (from which fear is absent) which finds an outlet in aggressive behaviour. Accompanied either by mimicry or the hissing note (*q.v.*) or both. When uttering notes in this posture the bird reaches head and body forward while remaining as it were "hinged" on its feet, or if on the ground may *walk* a few short tottering steps forward; in either case the procedure is suggestive of some strained and agonized attempt at vomiting. In its less exaggerated forms only the feathers on rump, upper tail-coverts and malar stripe may be appreciably erected. Male of tame pair when uttering hissing note at times appears deliberately to present himself laterally towards the female, and the reaching forward and hissing at the moment that the female happens to fly past the male seems to occur too frequently to be fortuitous. This posturing is commonly associated with heavy formal hops or in flight with a slower and oddly "stilted" wing-beat.

(2) Much as last but crest not, or only partially, erect and feathers on mantle somewhat raised giving a different outline, more "roach-backed" instead of the flat back with puffed out rump. Head usually inclined downwards to some extent. Used by female in what appear to be moments of sexual, aggressive or pleasurable excitement. Accompanied by mimicry or the "castanet-note" (*q.v.*). Both this and the preceding masculine equivalent commonly seen at the "ceremonial gatherings" in spring.

(3) Wings half spread, or sometimes fully spread out on either side of body, arched like a fan and quivered; body and head in somewhat crouching, horizontal position, but body usually well clear of perch; rump and tail somewhat raised above line of back and violently jerked and quivered with a rotary rather than a purely up and down or lateral motion. Seen from above the contrast between the still head and body and the brilliant quivering wings and spasmodically jerking white upper tail-coverts is most striking. May be accompanied by appeal note (*q.v.*). In less extreme forms bird may merely make slight "suggestion" of extending and quivering wings without tail movements and every intergradation occurs. Used by female towards male and by birds of *either* sex towards human owner, and was used by male of captive pair when fed by female. May accompany or anticipate a gift of food but appears primarily indicative of a feeling of submissiveness or inferiority or a desire to placate the object at which it is directed. Tame birds

commonly use it towards their owner when they have been frightened (by some other agency) and are still in a worried state, if he catches another Jay and it screams when handled, or if he shouts angrily at them. In the case of one tame male still in my possession the presence or absence of his mate or other "subordinates" seems the chief factor which decides whether shouting at him in an angry tone elicits the wing-quivering display, or rising anger that culminates in a furious attack at my face. On October 29th alone with him in the lighted shelter after dark, by shouting at him I elicited the full submissive display. Then his mate was brought in as well and one minute after her entry similar shouting at the male evoked aggressive behaviour culminating in attack. I have never known this display to be used towards its owner by any Jay that feared him. Nervous birds do not react at all in the above manner until *after* they have become quite tame and accustomed to feed from the hand without fear. A Jay purchased in the winter of 1947 that was in a very poor condition at first used the wing-quivering

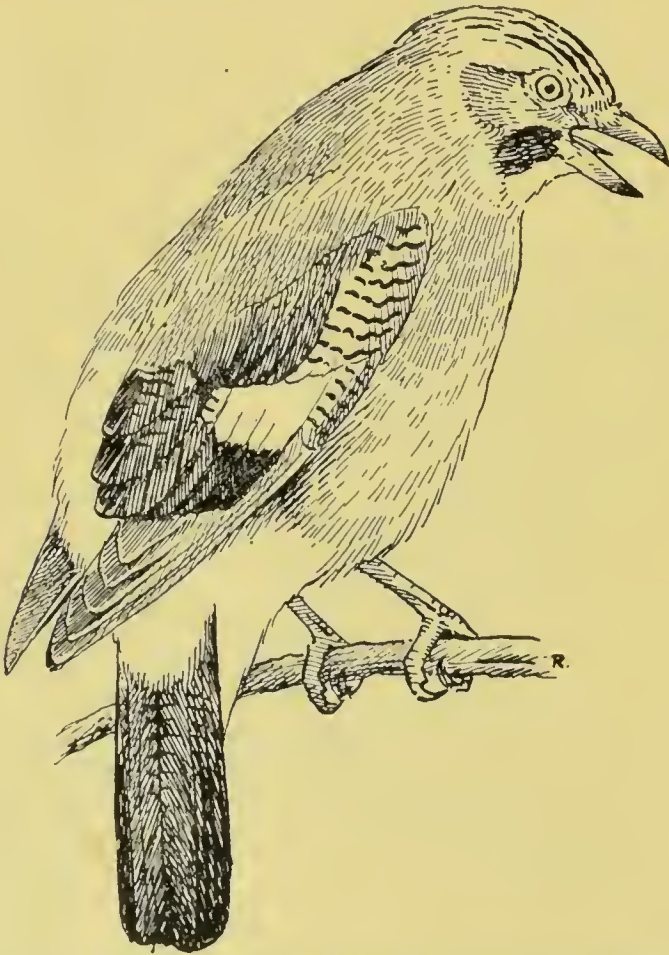


FIG 2. FEMALE IN POSTURE 2. IN MORE INTENSE VERSION FEATHERS OF MANTLE, RUMP AND CREST ARE MORE RAISED, EXAGGERATING THIS APPEARANCE.

display every time another Jay perched near it or a human being entered the aviary, but as it improved in health it ceased to do so to the same extent. In May, 1947, the wing quivering display by the female of the captive pair before alluded to induced an abortive and unsuccessful attempt at copulation by the male (both hatched June, 1946), but the birds did not then appear to be mated and made no attempt to nest. In 1948 when they nested, although the female was observed greeting the male in this manner on scores of occasions over a period of several weeks, no attempt at coition on his part was ever seen, although the subsequent hatching of their eggs proved that it must have occurred.

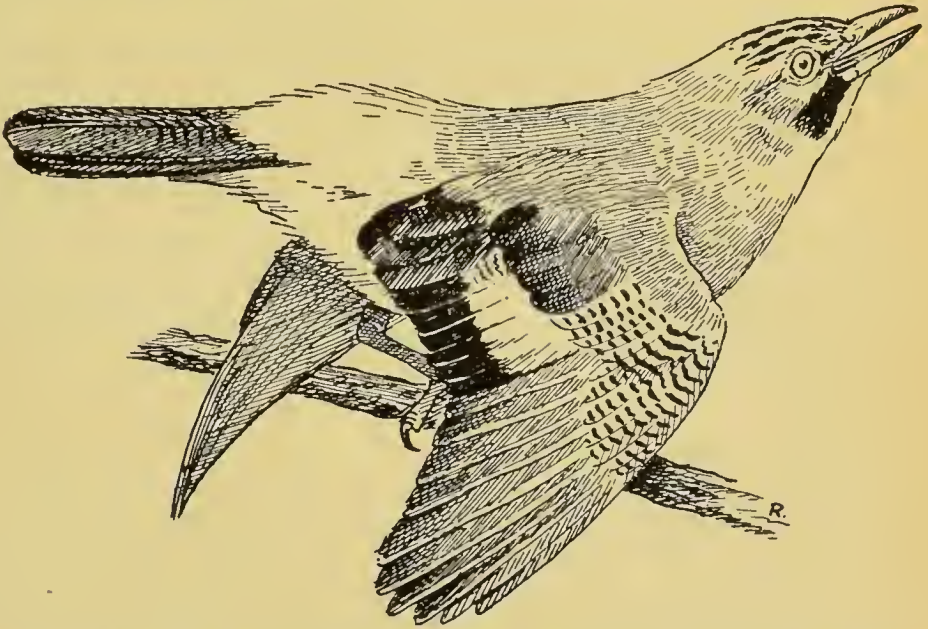


FIG. 3. MALE OR FEMALE IN SUBMISSIVE POSTURE. WINGS ARE ARCHED AND HELD OUT FROM BODY, NOT MERELY DROOPED STRAIGHT DOWN.

(4) Typical juvenile food-begging with flapping or fluttering wings and version of appeal call (*q.v.*) practically similar to that of juvenile. Both notes and movements of wings are perfectly distinct from (3) and I have seen no intergradations between the two. Observed on three occasions from female of captive pair when fed by male during incubation (out of scores of such feedings observed) and was regularly used towards me by the same bird in 1947 and 1948, *but only during the summer moult*. This point needs further investigation before one can be at all confident as to its significance, but it seems possible that bodily weakness through hunger or the moult may result in a temporary reversion to infantile behaviour. Similar behaviour in the female Rook (*Corvus frugilegus*) is well-known and I have observed parallel behaviour in the Carrion Crow (*Corvus corone*), Domestic Pigeon (*Columba livia*) and Palm-Dove (*Stigmatopelia senegalensis*).

(5) Body feathers puffed out, but crest flat or only partially erect, a threat posture of both sexes. Used by tame birds when attempting to attack or drive off Jackdaws (*Corvus monedula*) perching on or near their aviary. In minor forms with feathers usually little puffed out may be used when attempting to drive other birds—Jays, doves, pheasants, etc., away from food. May be accompanied by bill-snapping, the anger-appeal note, the rare grating note or the anger-screech.

(6) Crest fully erect, body feathers depressed; head and body jerked violently downwards and sideways from an upright position to one with head well below level of perch and back to original position in one violent movement. Accompanied by alarm note (*q.v.*) and used by both sexes when seriously alarmed. The same movements in a much less violent form may be used—often silently—under conditions of mild alarm.

(7) False bill-wiping, etc.: Exaggerated formal bill-wiping, jerky movements of body and tail, pecking at the perch and the tearing to pieces of any convenient inanimate object, commonly accompany nervous tension, particularly thwarted anger. I have only once seen the Jay hammer at its perch or other objects with *closed* bill as do crows and the Magpie (*Pica pica*) when in a state of nervous tension.

MIMICRY.

The extent to which the Jay habitually mimics other birds and even non-avian sounds can hardly be over-emphasized. Not only do both sexes frequently utter copied notes, commonly interspersed with low-pitched conversational versions of the appeal note, when foraging or resting at ease, but they are also used in emotional situations, particularly extreme anger. In tame birds, and most likely in wild ones also, there is a tendency for a few stereotyped imitations to be constantly uttered in moments of aggressive excitement. In tame birds favoured items in the repertoire may be "played to death" with irritating persistence for some weeks, but later gradually dropped in favour of new accomplishments if the bird does not again hear the original. Most copied sounds are delivered with remarkable accuracy, differing if at all from the original only in being less loud and more soft and husky in tone, but in some cases where accuracy appears to be impossible a sort of "symbolic interpretation" is achieved. The hooting of the Tawny Owl (*Strix aluco*) seems to be one of the most popular items in the repertoire of wild Jays as I have heard it wherever I have had opportunities for observing them unseen, in various parts of Yorkshire and in Shropshire as well as in the south of England. The chattering of the Magpie (*Pica pica*) might be mentioned as one of the notes that the Jay can mimic with absolute fidelity so that no person not seeing the bird could possibly detect the fraud.

INNATE NOTES.

The extensive repertoire of copied notes possessed by most Jays and their use in emotional situations—particularly at the spring gatherings—make great caution necessary in sifting out the innate notes. I have thought it safe to assume, however, that if a note is constantly used by different individuals in similar emotional situations and the same notes have been heard from wild birds under apparently similar stimuli, that such notes are innate. Even in association with mimicry the innate notes can be picked out as remaining more or less constant, while the copied notes vary from Jay to Jay.

Because of the difficulty of accurately conveying the Jay's notes by means of letter combinations (four people asked to transcribe the same note of the same Jay gave as many different versions) I have tried where possible to describe them in terms of notes likely to be familiar, and where these are helped out by letter combinations these follow the suggestions laid down in the introductory notes to *The Handbook*.

(1) *The "Appeal Note"*: The most frequently used note, and in all its many variants still to a critical ear recognizably based on the hunger-call of the juvenile. Could perhaps be written "Aaa" or "Aaar" (the *r* not rolled), or perhaps approaching "Oor" or "Choork" for the softer variants which have a decidedly muted, "kissing," sound. Typically the tone is querulous and suggestive of the mew of a hungry domestic cat, but it is capable of an infinite number of inflections and modulations. Only the more constant variants are listed but it must be understood that every intergradation between them occurs.

(a) Hunger call of juvenile, "Aa; Aah;" breaking into a squawking gabble when fed. A very similar version is sometimes used by adult female as previously stated.

(b) "Aaa" with a very querulous nagging tone. Used by tame birds when hungry, and in a quieter tone under conditions of frustration, as when a timid bird watches others taking mealworms from the hand but fears to do likewise. Is constantly used by wild birds and is probably an expression of a moderate degree of hunger and also of use as a contact note.

(c) Very similar to above, but softer and more plaintive, constantly repeated with an indescribably pathetic tone. Used by birds collecting food for young, by a bird with an acorn or other booty whilst apparently "trying to decide" where to hide or bury it, by birds indulging in pursuit flights in early spring that appear connected with pair-formation, by unpaired captive birds (in spring) at sight of any strange Jay, and once by a single bird (wild) that was trailing a constantly displaying pair and hopping about them uttering this note without ceasing whenever they perched posturing at each other.

(d) Short, husky, throaty version, deeper in tone but less loud than preceeding. Used by male offering to feed female and by

female as she accepts food from male or to solicit courtship feeding. Was also used, typically in a softer more crooning tone, by both sexes of tame pair when offering to feed young in nest, and female of this pair at first (?) sight of newly hatched young half raised herself in nest and for about ten minutes alternately fed, or at least appeared to feed them, and uttered a very low, tender, almost "cooing" version of this note.

(e) "Anger-appeal" note : A short husky panting note, rapidly repeated and barely recognizable as a variant of the appeal call. Used by tame pair (sometimes) when young were handled and always accompanied by violent physical attack on the offender. Heard twice from wild pairs dashing up in answer to alarm notes of fledglings when the latter were handled (but giving way to the alarm note on seeing man) and once by a pair as they chased a Sparrow-Hawk (*Accipiter nisus*) out of a spinney where they had young.

(2) *The Grating Note* : A short hard grating note, rather like alarm note of Mistle-Thrush (*Turdus viscivorus*). Used, but comparatively rarely, by tame birds when trying to drive away Jackdaws (*Corvus monedula*) alighting on their aviary. Only heard on three occasions from wild birds : once from one mobbing a Carrion Crow (*Corvus corone*), once from one as it turned at bay when attacked by a pair of Blackbirds (*Turdus merula*) and once by a bird as it flew at and struck (twice) a perching female Sparrow-Hawk (*Accipiter nisus*) about which it and three other Jays, none of whom ventured to follow its example, were hopping silently in posture suggesting mild alarm.

(3) *The Hissing Note* : A loud gasping hiss, with somewhat of an "r" sound in it, that a friend of mine likened to a "circular saw being allowed to run a little and then suddenly cut off" and which is presumably the note that the Rev. C. A. Johns (*British Birds in Their Haunts*) describes as "an accurate imitation of sawyers at work." Not unlike the hiss of a displaying male Golden Pheasant (*Chrysolophus pictus*) but much louder and harsher, and commonly prolonged into two or even three slurred "syllables." Used by displaying male (Posture 1) and I think primarily in the nature of sexual display although a tame bird habitually used it towards me in an apparently purely aggressive manner when his mate was incubating.

(4) *The Castanet Note* : An odd castanet-like clicking, several clicks being commonly run together. By female in conditions of excitement (posture 2). This note also appears to be used as a "base" for the imitation of mechanical noises. In this connexion it seems worth noting that of a tame pair, which both freely imitate the sound of the lawn mower, the female's version is a clicking imitation of the running of the machine, whereas that of the male is a "symbolic interpretation" quite free from any clicking sounds. I have heard very similar clicking notes uttered in a similar posture

to those of the female Jay from the Rook (*Corvus frugilegus*) and Hooded Crow (*Corvus cornix*).

(5) *The Chirruping Note* : A stammering disconnected chirruping, almost a twitter, very soft and faint in tone, commonly prefaced and interspersed by very soft, tender, muted versions of the appeal-note. Used by female (tame birds only heard, owing no doubt to poor carrying power of these notes) towards male, or towards owner in a variety of situations. Appears to be expressive of submissive affection and is also used in moments of apparent perplexity or relief from tension or fear, and sometimes, inter-mixed with mimicry, as a sort of sotto-voce self-directed conversation. Twice heard by male of tame pair. Once when he was moulting (during which time their normal roles were reversed and he was subordinate to his mate, as he was also during the period that she was broody) male was burying a peanut when female flew down and alighted on a spray a foot above him, obviously contemplating robbery. Male then looked up at her in a very meek manner and uttered these notes. On October 20th male in lighted shelter at night attempted to drive another Jay from its perch, but when it refused to be intimidated he seemed nonplussed and drew back a little from it. His mate then flew up and perched between them (quite fortuitously) and he uttered the plaintive twittering notes at her, to which she replied in kind.

(a) A louder, less tender, and more "chinking" version of the preceding. Used by male of tame pair when hopping around female in display posture during early (pre-building) stages of breeding-cycle. Usually heard at spring gatherings of wild birds, and at one of these I observed three birds in posture 1 that all appeared to be uttering these notes as they hopped all about a fourth that perched immobile. As, however, there were many other Jays present that could not be clearly seen (as usual it was taking place in thick cover) it is not certain that the actions of these four birds had reference to each other.

(6) The "very harsh far-carrying deliberate note . . . quite like heron's "frank" call of *The Handbook*.

In what I think to be its "pure" state this note is a very loud crow-like "Kraah" or "Kraa-aah", at its loudest, much louder and more arresting than any other corvine utterance known to me, except possibly the Jay's most violent alarm notes. It has, however, endless subsidiary versions, and the bird constantly intergrades it with apparently genuine imitations of the Heron's (*Ardea cinerea*) call. Used at the spring gatherings and in its loudest forms associated with intense excitement of the participants. This is doubtless the "loud harsh note" said by W. H. Hudson (*Birds and Man*) to be used to call the birds together for these gatherings. It may, however, be used by odd birds without having this effect, and gatherings entailing a great deal of excitement and display may take place without this note being used.

(7) *The Alarm Note*: The harsh rasping screech that most people naturally but incorrectly assume to be the Jay's most usual note. In serious alarm is delivered with great vehemence and the movements previously described (6). This usually induces similar reactions in other Jays near by. Under what might be called the minimum conditions of alarm that will, or rather may, elicit screeching, the bird makes no violent gestures and may continue to feed, preen or bathe between shrieks. In this form the notes commonly have no effect on other Jays, beyond putting them mildly on the "*qui vive*," and the difference in intensity of the notes is quite discernible to the human ear, although naturally every intermediate degree of urgency occurs. That fear, rather than anger or protest is—with the exception to be discussed later—the emotion inducing screeching, seems tolerably certain. For example when one handles a fledgling Jay from a wild brood and it cries in alarm the parents at once dash up (if they are within hearing, which is not always the case) and fly about uttering the alarm notes with great vehemence. Yet when I handled the young of a captive pair—on a great many occasions—although I was attacked furiously by both parents, neither uttered the alarm notes, nor was the anger-screech (*q.v.*) used except on two occasions. So it seems likely that the screeching of wild Jays under these circumstances is an expression not so much of their resentment at the human intruder as of the fear which alone prevents them from attacking him. If I catch one of my tame Jays at night it screeches loudly in alarm, but speaking gently to it soon calms it. In the case of one very tame hen bird it is only necessary to speak a single word or merely to shine the torch in my face for her instantly to cease screeching; yet there can be no doubt whatever from their behaviour that all the birds hate and dislike being handled most intensely.

(7a) *The Anger-screech*: A very harsh sharp single screech may be uttered by a Jay under conditions that suggest that anger is the emotion inducing it. If a peanut or some other titbit is thrown in the general direction of the subordinate bird of a couple of captive Jays, the dominant bird commonly dashes at it uttering this screech, which has the effect of deflecting the subordinate bird even if it is already diving to pick up the nut. A bird that by accident drops an acorn or other nut that it is eating also utters this note as it dives headlong to retrieve it. A Jay perched on a branch of an elm against the trunk in Kensington Gardens which dropped an acorn screeched in this manner as it—to use the words of a second witness—"literally fell down the trunk of the tree" to retrieve it. In a particularly harsh tone this note is sometimes used by a tame male bird when attacking me; but it seems significant that this usually happens when the attacks are thwarted or more particularly if I behave in a way that would frighten a less bold and angry bird, such as tapping him on the breast with a finger or throwing a handkerchief over his head. Although at

present it would seem necessary to consider this note on its face value as a threat, yet I think the emotion concerned might prove on further analysis to be closer akin to alarm than to anger. It is certainly never normally used to make subordinate birds vacate a perch, bath or food-dish. A single sharp screech not to my ears differing from the above may be uttered by a wild female Jay as she is flushed from the nest, although quite as often she flies off silently.

(8) *Bill-snapping* : Loud snapping of the mandibles is used as a threat when attempting to drive other birds—of any species—from food, or as a prelude to attack.

The accompanying drawings were done by Mr. R. A. Richardson from my own very poor sketches and are attempts to give a general idea of the postures represented. Once again it must be emphasized that although the drawing may suggest a similarity between the submissive (?) display and the food-begging of the juvenile in actual fact the actions used are so different that no close relation between the two is suggested.

On re-reading this paper prior to publication it seems advisable to touch on a few later observations.

(a) *The Grating Note* has since been heard many more times by birds attacking Carrion Crows, Jackdaws or Sparrow-Hawks and by birds attacked by thrushes (*Turdus* sp.) It appears only to be uttered as the Jay darts at its enemy, or as it turns to defend itself from attack. In some variants (where considerable fear is entailed?) this note approaches closely to a short hard version of the alarm.

(b) *The Hissing Note* appears not to be used by many wild males when displaying. They commonly use various stereotyped phrases, apparently mainly of copied sounds, and usually some hissing sound occurs in this phrase. Therefore although the hissing note as described has been heard from at least three different wild birds it seems possible that it may not be entirely innate.

(c) Clicking sounds may occur in the display phrases of (presumed) males, but they are quite different in character from the typical clicking notes of the female. This difference cannot well be described, but there is no danger of the ear failing to distinguish it.

(d) Coition was observed in a captive pair on April 23rd, 1949, at 4 p.m. The female, slightly in display posture (2) was on a perch about four feet from the male, who stood very still watching her. Suddenly she went into a most extreme and ecstatic version of the submissive display (3). Her wings were arched and spread to their fullest extent and tilted forwards, as was the whole body, suggesting the display of an Argus Pheasant (*Argusianus argus*) or Sun-Bittern (*Eurypyga helias*), the tail was raised and both wings and tail violently quivered. The male flew on to her back and copulated with fluttering wings. The female maintained the wing-spread posture during coition and afterwards jerked herself in the manner that Jays and other passerines commonly do after defæcation, but more violently, for several seconds.

NOTES.

EXTENDED SONG-PERIODS

SEVERAL observers have supplied further records of various species singing outside the period recorded for them in the song charts in *The Handbook*, viz.:

WHITETHROAT (*Sylvia communis*): One in good song—usually in the morning and only occasionally in the afternoon—August 22nd to 26th, 1948, at Ffestiniog, Merionethshire (R. W.); one singing "loudly and well" on August 28th, 1948, at Ravensden, Beds. (C. W. T.); one in good song on September 6th, 1948, at Sale, Cheshire (R. W. and J. C.); at least three singing frequently, but with rather shorter phrases than usual, on September 18th, 1948, at Mistley, Essex (J. C. F.). (*Vide antea*, vol. xli, pp. 50, 358.)

LESSER WHITETHROAT (*Sylvia curruca*): One in full song throughout the evening of July 24th, 1948, and singing a little on the morning of July 25th at Thurleigh, Beds. (C. W. T.).

REDSTART (*Phoenicurus phoenicurus*): A male in full winter plumage in "good song" on August 5th, 1948, at Llangollen, Denbighshire (R. W. and J. S.). (*Cf. antea*, vol. xli, p. 50.)

J. CASSERA, J. C. FELTON, J. SOUTHERN, C. W. TOWLER, R. WHITTENBURY.

CANNIBALISM IN THE ROOK.

ALTHOUGH the Rook (*Corvus frugilegus*) is known to take the young of certain birds, I do not think that there is any record of it attacking the young of its own species. The following note may therefore be of interest.

On the morning of April 27th, 1947, I was watching a small group of Rooks at their nests. During a period when both parent birds were away from one particular nest, a third Rook landed on the rim and began to peck vigorously inside. After a few minutes it pulled out an unfeathered young bird, and it then flew with it into the branches above. Here it began to pick at it until disturbed by a returning parent, when it flew off, carrying the young bird in its bill. On passing too close to another nest, however, it was attacked and the nestling was dropped.

It then flew back to the original nest and perched near by, the parent bird now and again making half-hearted attempts to drive it away. After a time, the nest was again deserted and the intruding Rook was back immediately. This time it pulled another dead nestling out and flew with it into the branches, where it lodged its burden in a fork. Returning to the nest, it dragged two more lifeless birds on to the edge, and began picking at them. Before long however, both parent birds returned and drove the intruder off. After several attempts to reach the nest again, the third Rook was finally driven off, and was seen no more.

J. A. CALDWELL.

ROOSTING BEHAVIOUR OF CHAFFINCHES

THE following behaviour of Chaffinches (*Fringilla cœlebs*) prior to roosting may be of interest, as I do not recall having seen it on record, and also I believe that it may prove to be not unusual in this species and that it may occur in other Fringillidae, and further unrelated species. Similar behaviour is familiar in roosting Pied Wagtails (*Motacilla alba yarrellii*).

Just before sunset on December 29th, 1948, at Gosforth Park, Northumberland, in a very strong north-west wind, a party of six Chaffinches appeared flying at about 100 feet above the lake, and commenced to circle anti-clockwise in a scattered flock, with a very light and airy flight, describing marked undulations the whole time. In the course of ten minutes the party gradually increased in number until there was a total of eighteen birds. Suddenly they broke up and dropped on to the topmost twigs of some high trees, where they remained in silence for several minutes before flying down into some thick underlying rhododendron bushes.

JOHN ASH.

[Although we do not recall observing such behaviour on the part of Chaffinches we suspect it is quite normal, but little seems to be recorded about the roosting behaviour of this species and possibly other readers can contribute observations —EDS.]

BEARDED TITS AT CLEY, NORFOLK, AND IN SUSSEX.

ON October 16th, 1948, about 9 a.m. (Summer-time) I started across the marshes at Cley. I had heard the previous evening that one or more Bearded Tits (*Panurus biarmicus*) had been heard in the large reed-bed just west of the east wall, and I was proposing to go there to investigate. However, first I decided to cross the nearer marsh, to look for waders. This is about a quarter of a mile, as the crow flies, from the large reed-bed.

The weather the previous day had been rather overcast, with some rain in the evening, and a rather light west wind had been blowing. On the morning of the 16th there was scarcely any wind, but there was low cloud, which sometimes produced drizzly rain. How far these conditions prevailed also over the North Sea, I do not know.

I was in the middle of the first patch of marsh, at about 9.15 a.m., when suddenly my ear was caught by a half familiar bird-note in the air above my head. A moment later I saw a compact party of Bearded Tits shoot down out of the sky into a small reed-bed to my left, fifty yards distant. I hurried to the spot, in time to observe the party, which was extremely noisy, hopping up the reeds into full view. Within a minute or two of their first appearance they rose into the air again, and with rapid, twisting flight rose to a height of perhaps fifty feet, flying eastwards and then continued at this height twisting about, still calling, and finally dropped down into the big reed-bed. While they were in the air I counted them, and found there were ten birds.

Not more than ten minutes later, whilst I was still exploring the same patch of marsh, I heard the notes of Bearded Tits again in a small reed-bed very near me. Four birds appeared up the reeds, and flew to another small reed-bed across a marshy field.

I did not in fact visit the main reed-bed that morning, but observations during the following eight days showed that it contained a number of Bearded Tits, though they never appeared high in the air again, nor were more than two or three seen together. But the reed-bed is dense and extensive, and the call-note was very frequently heard in various parts of it.

It is quite possible, of course, that the birds first observed had only flown across the large reed-bed; but the possibility that they were at that moment arriving, either from the Broads or from overseas, cannot, I think, be ruled out. There is evidence that Bearded Tits had been heard in the big reed-bed during the previous fortnight. But in view of the many ornithologists who had been in the district, it cannot be easily believed that such a large number had been present until, perhaps at the earliest, a day or two before.

A high flight such as I saw seems to be most exceptional. Miss Turner, in her *Broadland Birds*, only refers to flights high above the reeds at the time of the courtship flight. Dr. Rivière, in his *Birds of Norfolk*, refers to an anonymous observation, quoted in the British Association Reports, of Bearded Tits descending into a reed-bed near Yarmouth out of the sky, but comments that it sounds most improbable. Apparently, therefore, he knew of no comparable observation. Dresser, in his *Birds of Europe* quotes some Dutch authorities as saying that in Holland the Bearded Tit is partially migratory, and in the middle of last century it would seem, from Dresser, that a south or south-west movement across Belgium Germany and France was normal in the autumn.

I believe three broods are known to have been hatched by two pairs at Hickling in 1948 that might conceivably bring the total there to 25. A day or two after my observation, a party of 11 was seen at Hickling. 14+11 make 25, but it seems hardly credible that the total population of Norfolk should have shown itself to two observers in two days. I do not know the present position in Suffolk. The possibility of the Cley birds having come from Holland seems to be worth further investigation.

H. G. ALEXANDER.

The conclusion certainly seems almost inescapable that the birds described by Mr. Alexander were immigrants, and in this connexion attention may be directed to the note by Mr. T. C. Gregory in *British Birds*, Vol. xxxv, p. 228, recording the discovery in the winter 1941-2 of a considerable number of Bearded Tits in a Kentish marsh. Mr. Witherby was reluctant to believe that the birds could be immigrants, but there was in fact no direct or positive evidence to support the suggestion that they had bred in the previous

year and there is good reason to believe that they were winter visitors from a distance. Almost all had disappeared by March, 1942, though a few remained in one locality, as Mr. Gregory kindly informs me, and small numbers were seen in the winter 1942-3 but none have been met with since. The possibility that the birds seen in 1941-2 had come from Norfolk was not entirely excluded, but I have always thought it more probable that they came from the Continent, although the species is not reported to be an overseas migrant, and this view appears to be strengthened by the consideration that the numbers were, Mr. Gregory informs me, considerably in excess of the original estimate of about a hundred. It gains further support when the facts are considered in conjunction with the recent Norfolk occurrences. In this connexion, however, it seems worth quoting what the late Jim Vincent wrote from Hickling to Mr. Witherby at the time of the Kent discovery. The relevant part of his letter reads as follows:—

“The wholesale disappearance of Bearded Tits from E. Norfolk, which was general puzzled me in 1940, and it may be that the majority of our stock was pushed south by the severe winter. There has always been a local movement of this species from here in severe winters towards Suffolk up the Waveney and along the Yare 40 to 50 miles away. Many of the reed-beds along these rivers were cut extensively in 1940, and by stages they may have pushed *en masse* farther south, as it is a habit of this species if in flocks of 30 or more, one moves and they all move; also when one party moving from place to place comes across another party they band up together like Long-tailed Tits.

As to its powers of flight, the Bearded Tit is more capable of a 50-mile flight across the Channel or along the rivers than the Long-tailed Tit is and also possesses twice the flying speed of the Long-tailed Tit. They fly about 20 to 30 yards high, and the first decent reed-bed they come to they dive down into this. After a short time in this they mount up and make a beeline for another: . . . Whilst the wholesale disappearance from E. Norfolk was mysterious to me in 1940, I was always surprised at what turned up to breed in 1941.”

It will be observed that the behaviour recorded by Mr. Alexander is exactly that described by Jim Vincent as typical of Bearded Tits on the move. Mr. D. H. Brown's record of four birds wintering in Sussex was received after Mr. Alexander's note had gone to press. There can be no doubt that these birds were winter visitors to the locality, and it is to be noted that the observed dates of arrival and departure were much the same as those recorded by Mr. Gregory for the far larger number seen in Kent. B. W. TUCKER.

ON November, 28th, 1948, I was able to identify 4 Bearded Tits (*Panurus biarmicus*) on the Crumbles, Eastbourne. They frequented some small clumps of reeds before flying into a large bed of recent reed and sedge, several acres in extent, mostly growing in shallow water. Subsequent visits enabled me to get excellent views of the birds, which were found to stay mostly in this reed-bed.

The birds were predominantly rufous-brown with buff, black and white lines on the closed wing and white on the long, graduated tail.

The males (of which there were two) were distinguished from two females by the black "beards", pale blue head and pinkish under-parts. While I was standing still among the reeds the birds sometimes came so close that I could easily discern the yellow eye without the aid of binoculars. The characteristic "ping" and "ticc" notes were heard always and there was also a more melodious note corresponding to *The Handbook's* "tuii."

Numerous other observers saw the birds before they left. I last found them on March 19th, 1949, and searches on March 29th and after proved fruitless.

DAVID H. BROWN.

RED-BACKED SHRIKE STRIKING HUMAN INTRUDERS.

ON June 15th, 1948, I was watching a pair of Red-backed Shrikes (*Lanius collurio*) by the side of the Petersfield road, about a mile out of Winchester. As I unwittingly approached their nest I was struck quite firmly on the top of the head by the male, which had previously been "chacking" and swinging his tail on a small tree immediately behind and above me. I turned to see the bird, but was almost immediately struck again from behind. I think that the whole of the bird's body hit me as it passed, but it may only have been its feet. I then experimented and found that he would attack me side-on (twice), but was reluctant to attack when I faced him (once); each time he would have struck me had I not ducked. Once, further away from the nest, the male bird swerved away before reaching me. The male only was present at the time and always flew horizontally to the ground when attacking.

M. B. Casement was similarly attacked when looking at the nest, but not until June 18th, the day after the young flew, when the first indication he had of the presence of the male was a sharp bite at the back of his head. On looking round he was again bitten. After that whenever he looked round the male swerved away. He says that the bird flew low down and rose sharply at the last moment to strike him with its beak. When he was attacked there was very little clearance room for the bird after it had struck and this may account for the use of the beak rather than the whole body or feet. This behaviour continued for a week, by which time the young had disappeared.

M. T. MYRES.

COLLARED FLYCATCHER IN DEVON

ON April 20th, 1948, close to Baggy Point, North Devon, we observed a small black and white bird perched on the top spray of a gorse bush about twenty yards away. We were both able to examine it with glasses for about a minute. It was at first turned sideways to us and slightly away, but afterwards turned its back towards us. It had a well defined black head and black upper-parts and a prominent white collar round the back of the neck. There was a considerable amount of white on the wings and some on the tail, apparently on the outside. Before it turned its back to us the fine flycatcher beak, white on forehead and whitish under-parts were also seen.

While perched it bowed and bobbed in a characteristic way and after about a minute it flew off with quick flycatcher wing-beats, but, as it seemed to us, a more direct flight than that of a Spotted Flycatcher (*Muscicapa striata*). It made height rapidly, but did not clear a steep hillock ahead and landed on a bush just under the top, but flew on almost at once in a N.N.E. direction and was not seen again.

We both supposed the bird to have been a male Pied Flycatcher (*Muscicapa hypoleuca*) and it was only after returning home and consulting *The Handbook* that we realized that it was evidently a Collared Flycatcher (*M. albicollis*). There was no possible doubt about the well-defined white collar, which was clearly seen to be complete round the back of the neck when the bird turned its back to us.

D. WILSON AND D. FRENCH-BLAKE.

THE CLUTCH OF THE REED-WARBLER.

IN *The Handbook of British Birds*, Vol. ii, p. 46, it is stated with reference to the Reed-Warbler (*Acrocephalus scirpaceus*): "Eggs.—Normally 4, occasionally 3 or 5".

In Holland clutches of 5 eggs are of common occurrence, though 4 eggs are the rule. My material is not extensive, but of 15 full clutches I had under observation during the years 1923-'27, 9 held 4 eggs, 4 held 5 eggs and 2 held 3 eggs only.

From Sweden, where the Reed-Warbler is extending its range to the north, Paul Rosenius mentions in his *Sveriges Foglar och Fogelbon* (which contains a mass of first-hand information of this type from Sweden), Bd. i, 1926, p. 80, that from 30 clutches seen by him only 7 contained 5 eggs. From 69 full clutches examined by Morbach in Luxembourg 4 held 2 eggs, 9 held 3 eggs, 44 held 4 eggs and 12 held 5 eggs (J. Morbach, *Vögel der Heimat*, Bd. 3, p. 78, Esch-Alz, 1943).

I may further draw attention to the fact that in Niethammer's *Handbuch der Deutschen Vogelkunde* Bd. 1, 1937, p. 328, it is stated that in the majority the full clutch consists of 4 eggs, while 5 eggs occur often and 3 eggs not rarely.

So it seems that there is a difference between the number of eggs laid on the Continent and in Great Britain.

FR. HAVERSCHMIDT.

[We have submitted Mr. Fr. Haverschmidt's note to Mr. P. E. Brown, whose comments may be summarized as follows:—

- (1) Observations at North Cotes, Lincs., over three complete breeding seasons and parts of two others produced the following figures for 80 complete clutches omitting one c/2 completed on August 10th, 1949:—c/3—9; c/4—56; c/5—15. Neglecting the four c/2 in the Luxembourg records we have the following comparative figures:—

	Total No. of		% of total			Average
	clutches	c/3	c/4	c/5	clutch-size	
Holland...	... 15	13.3	60	26.7	4.13	
Sweden	... 30	13	—	23.3	—	
Lincs. ...	... 80	11.25	70	18.75	4.075	
Luxembourg	... 65	13.8	68	18.2	4.05	

- (2) If these figures suggest any difference between English and Continental birds it is that c/5 occurs more frequently in Holland than in Lincolnshire. But Lincolnshire figures show that clutch-size diminishes as the season progresses—4.21 in June, 3.38 in August. c/5 is most frequent in June when c/3 is correspondingly rare, amounting to only 2% of completed clutches. In August on the other hand 50% of completed clutches contain less than 4 eggs and there is no record of a c/5 completed in that month. Thus, to be strictly comparable, the Continental data should cover complete breeding seasons, but we are not told whether this is the case. It would be possible, by taking June figures only, to get an inflated figure for c/5.—EDS.]

WINTER FEEDING HABITS OF BLACKCAP.

DURING the winter of 1943-44, while based on the Algerian port of Djidjelli, I observed many Blackcaps (*Sylvia atricapilla*) about our camp. They could always be seen feeding on scraps of food outside the galley. It was a common sight to see them on top of the offal bins feeding on our waste food, and in company with Sardinian Warblers (*Sylvia melanocephala*). Several Blackcaps became very confiding, and in due course I had them feeding from my hand on bread, cake, bacon rinds, beans and potatoes. S. E. LINSELL.

[It may be noted that Blackcaps wintering in the South of England have been observed on a number of occasions to visit bird tables regularly to feed on scraps.—EDS.]

BEHAVIOUR OF SONG-THRUSH

ON February 26th, 1948, at 9.15 a.m. a Song-Thrush (*Turdus ericetorum*) came to bathe in my bird-bath at Sampford Arundel, Somerset. Having barely begun, it was driven off by a male Blackbird (*Turdus merula*). The thrush lit on the lawn below the bath, and *continued the actions of bathing*, squatting on the ground, dipping its head, and flapping its wings. It tried four times to get back to the water, but the Blackbird repulsed it, and each time the thrush went through the motions of bathing, on the short, dry grass. Finally it preened itself, and flew away. E. M. WILLIAMS.

EARLY MIGRATION OF SAND-MARTINS FROM THE SOUTH COAST.

ON July 19th, 1948, my wife and I spent four hours watching the sea from Dungeness, Kent. During this time we saw about 100

Sand-Martins (*Riparia riparia*) leave the Point and make off over the sea in a south-westerly direction. During the following three days Sand-Martins were constantly seen flying westwards, both along the coast in the Midrips-Camber area and inland over Walland Marsh. On July 23rd we again spent four hours at Dungeness Point, but this time only four Sand-Martins were seen to leave.

The Handbook states that emigration from the south coast takes place from the end of August (occasionally the first week). However, I see that in the 1938 *South-Eastern Bird Report* Dr. N. H. Joy recorded the emigration of this species as beginning on July 19th at Dungeness.

D. D. HARBER.

SOME NOTES ON THE GREEN WOODPECKER.

ALTHOUGH the colours of the soft parts of the adult Green Woodpecker (*Picus viridis*) are well known, those of the juvenile bird, which are noticeably different, appear to be undescribed. Each of two juvenile females recently examined by the writer had the tarsus and toes glaucous blue, the iris dark blue-grey, and the bill matt black, minutely tipped yellowish horn.

Moreover in both examples the crown was decidedly reddish-orange in colour, and quite unlike the crimson crown of the adult bird, which the juvenile crown is described as resembling.

It may also be recorded here that in both the adult and juvenile of this species, the *inner* webs of the first to the seventh primaries are emarginated, decidedly so on the first to the fifth, and less so on the sixth and seventh. *The Handbook* and other works consulted refer only to the emarginated outer webs of the third to the seventh primaries.

R. WAGSTAFFE.

LESSER WHITE-FRONTED GOOSE IN NORFOLK.

(Plates 61 and 62).

ON January 24th, 1949, I had brought to me for identification a Lesser White-fronted Goose (*Anser erythropus*) shot on Breydon marshes. It came in from the sea flying alone and was shot by Mr. R. F. Porter, one of a family of well-known sportsmen of Great Yarmouth, who was mostly attracted by the high-pitched call the bird was making.

The undermentioned rough measurements were taken before the bird was forwarded to the Norwich Museum for exhibition, for this appears to be the first definite record for Norfolk, the history of one reported as shot on the Wash in 1900 not having been considered entirely satisfactory (cf. *Handbook of British Birds*, vol. iii, p. 191).

Sex: Male. Stomach contents: Nil. No trace of food in organs. Gizzard was full of fine sand of the seashore kind. Weight: 3 lb. 8½ ozs. Length: 24 ins. Wing measurements: 21½ ins. Wing span: 4 feet. Photographs of the bird in the flesh will be found on Plate.

HAROLD DAVIES.

COMMON EIDERS IN WORCESTERSHIRE AND STAFFORDSHIRE

ON April 21st, 1948, a single duck or immature Common Eider (*Somateria mollissima*) appeared at Upper Bittell Reservoir, Worcestershire, and was watched by G. W. R., who noted the dark brown, mottled plumage, heavy, broad build, and the characteristically shaped head and bill. The head appeared very heavy, and little or no angle was formed by the forehead and bill. The breast was slightly lighter and more mottled than the rest of the plumage.

At Cannock Reservoir, Staffordshire, on October 31st, 1948, both the undersigned observers watched a single immature Common Eider, which was joined at 13.35 hours by a second bird which flew in from the east. The two remained here for about three weeks. Apart from the characteristic shape of head and bill, dark colouration, and heavy build, the following characters were recorded: both birds had a light eyestripe, and slightly lighter breast, whilst one of them had somewhat darker flanks. They dived frequently—half opening their wings in doing so, and at times travelled some distance under water.

The species has not been recorded previously in either county.

G. W. RAYNER AND A. R. BLAKE.

DISPLAY OF SLAVONIAN GREBES IN WINTER

ON January 5th, 1949, I watched the display of two Slavonian Grebes (*Podiceps auritus*) at Cheddar Reservoir, Somerset.

The two birds faced each other with necks erect and rigid, and with bills almost touching, active display commencing when one bird shook its head rapidly from side to side. Then both began an alternate bobbing motion, each in turn lowering the head to the level of the body and moving it quickly up again, the second bird following suit after a momentary pause. This display, with occasional head-shaking, continued for several minutes, the birds finally drifting apart; similar behaviour was seen later.

Winter display would not appear to have been previously recorded for this species, although occurring not uncommonly in the Great Crested Grebe (*Podiceps cristatus*).

M. J. WOTTON.

MIMICRY BY OYSTERCATCHER

WHEN watching a large flock of mixed waders in Pwllheli Harbour, Caernarvon, on September 7th, 1948, I heard an Oyster-catcher (*Hæmatopus ostralegus*) mimic the Common Redshank (*Tringa totanus*) and Common Curlew (*Numenius arquata*). When I first heard this I thought I must be deceived, but on several occasions the bird was directly over me, which I think precludes any doubt. The notes would certainly have been taken for those of the actual birds, the only difference being that the tone was not perfect.

I can find no reference to a similar occurrence. A. W. WOLTON.

NOTICE TO CONTRIBUTORS

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BRITISH BIRDS

NUMBER 10, VOL. XLII, OCTOBER, 1949.

THE FLUCTUATIONS OF SOME COMMON SHORE-BIRDS ON THE NORTH NORTHUMBERLAND COAST.

BY

FRANK BRADY, M.Sc.

FROM January, 1945, to December, 1947, I was able to keep fairly regular records of the numbers of shore-birds from the Tweed Estuary to Holy Island. As this area was too large to be covered completely by one observer, I chose certain routes and followed these as often as possible, often fortnightly, sometimes almost weekly. The selected regions were (1) the sandy and rocky shore for half a mile north of Berwick, where birds from the Tweed Estuary congregate at high tide, (2) the sandy and rocky shore stretching for four miles southward from the Tweed Estuary to Cheswick, (3) a two-mile stretch of mainland shore bordering the extensive mud-flats in the neighbourhood of Holy Island, where counts were made about the time of high-tide.

With the exception of Oyster-catchers and Curlews, I rarely saw any indication of movement of birds from one of these regions to another. Consequently, even when counts were made over the different stretches on consecutive days, I have considered the total to represent the number of birds in the regions under observation at that period of the month. Therefore, the dates given in the appended tables, from which the graphs were constructed, are approximate only.

At the end of the three years, when I studied the data obtained from my census lists and from frequent short visits to the shore when a full count of all species was not made, it seemed obvious that certain important movements had taken place in addition to, or within, the normally recognized spring and autumn passages.

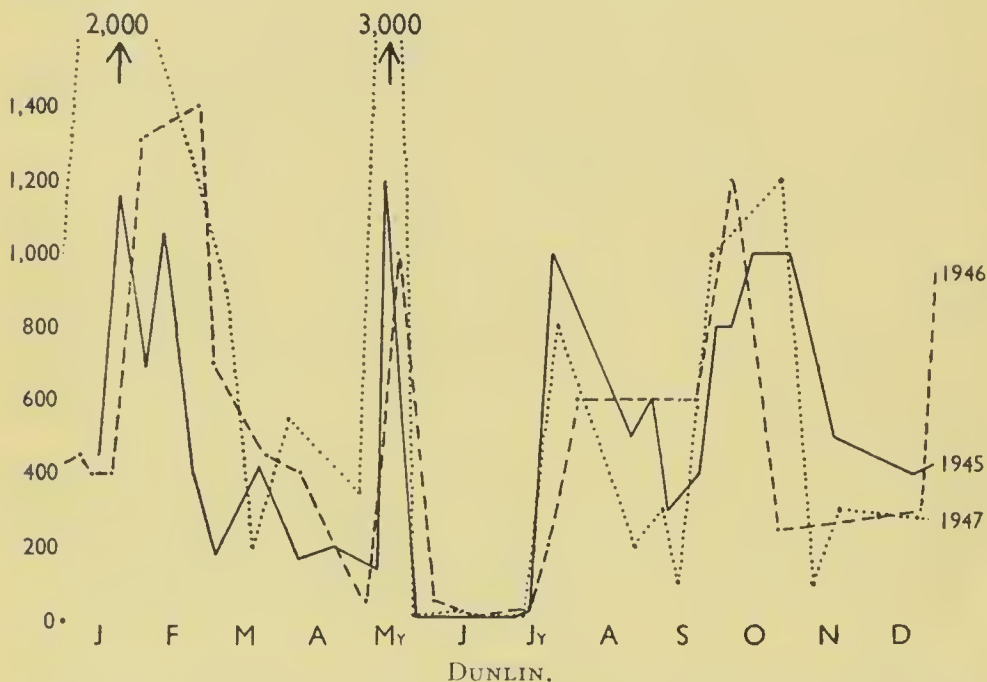
I realize, of course, that fortnightly data are not sufficiently continuous to furnish accurate information on the fluctuations of any one species. Several waves of migrants could have passed in the interval between counts. However, in view of the fact that for three consecutive years the same species showed similar major waves of passage and that comparable waves were obtained for several other species, the results appear to have considerable significance.

Since 1947, observations have of necessity been more sporadic, but in general they correspond very well with the results recorded here. Consequently, I decided to write up these notes, rather prematurely perhaps, to draw attention to my findings in the hope that supporting evidence may be discovered by observers in other parts of the country.

The main species involved are as follows :—

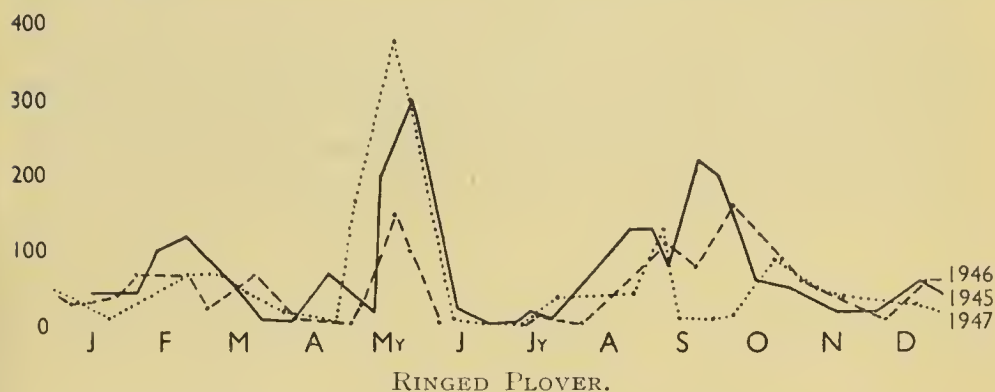
DUNLIN (*Calidris alpina*).

If reference is made to the graph, it is at once obvious that a double spring passage and a double autumn passage occurred. The large flocks in January, 1947, were undoubtedly consequent upon the exceptionally severe weather conditions of that winter, but in 1945 and 1946 there was a marked influx at the end of January and in February, the numbers being considerably smaller in March and April, followed by another influx of shorter duration in May. One possible explanation is that the first influx was more in the nature of a surge northwards by birds wintering farther south in England, with a tendency on their part to linger on the mud-flats of this part of the coast, which undoubtedly provide one of the last great feeding grounds before the birds either disperse to their moorland breeding haunts or make the sea-crossing to northern Europe.



On the other hand, since *The Handbook* states that practically all Dunlin present here in winter belong to the Northern race, it may be that the first wave was the result of Southern Dunlin from North Africa passing northwards and taking some of our winter residents with them, as fewer birds are present in April than in December-January. However, because of the difficulty of separating the Northern from the Southern race in the field, especially in winter plumage, this would be difficult to prove without large-scale shooting or trapping. On the occasions when I did feel satisfied in distinguishing birds in *summer* plumage in May, they largely belonged to the Northern race. Consequently, this second

wave may then be considered to consist of birds wintering well to the south of the British Isles, which have delayed their journey till their breeding grounds in the Far North had been released from winter's grip.



The great flocks of Dunlin almost completely disappeared by the end of May and only a few non-breeding birds, usually in summer plumage, remained during June. The sudden rise in numbers about mid-July was as striking as the sudden departure in May. The first newcomers were all adults (and belonging to the Southern race according to my few successful identifications), but juveniles became common in late July. A marked decline in August was followed by a sharp rise at the end of September, to a peak in October. By the end of November the winter population became more or less static.

This double autumn passage falls into line with my second suggestion concerning the double spring passage. The Southern race passed through first, the stragglers being merged with the forerunners of the second and greater wave of birds that had nested farther afield, some of these remaining to constitute the winter population. However, the Northern race could quite possibly have been represented in the earlier movement, because Whimbrel, which have a similar breeding range, move north in May and are on the return journey by early July.

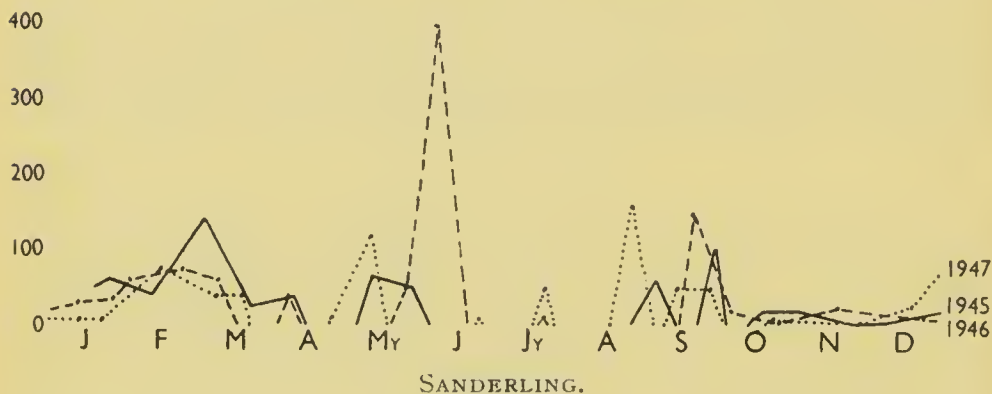
RINGED PLOVER (*Charadrius hiaticula*).

The movements of this species bore a close relationship to those of the Dunlin, though the first spring and first autumn movements were not so clearly marked. As a general rule, by the end of March only the breeding birds remained, dispersed along the high water-mark, about five pairs per mile, and on patches of shingle among the dunes. In early April several hollows, fashioned by the male in his display ceremony, were made in each territory, but eggs were seldom laid before the last week of May.

In late April or early May, while these nesting operations were in full swing, the passage migrants arrived and flocks of from 100 to 300 were counted, only a few of the birds being in breeding plumage.

I noticed no increase in the breeding population after this wave had passed on. Eggs were commonly found up to the end of June, but these were second clutches, often made necessary by the destruction of the first laying by high spring tides.

Numbers rose slowly during July and more rapidly in August to a first peak at the end of August or in early September and a second one a month or more later. A feature of the September gatherings was a form of display in which birds often stood face to face in a very rigid attitude, crouching forward with tail elevated and spread, and there was much petty chasing with widespread tail.



SANDERLING (*Crocethia alba*).

This species also showed a distinct double passage in spring. There was a gradual increase in numbers during January and February, followed by a decrease which culminated in a period in the second half of April when Sanderling were completely absent. The peak of the main spring passage was in May or the first few days in June, after which Sanderling were rare. In July, my only records were of two small flocks of adults, in the second half of the month, which were the forerunners of the autumn passage, including many juveniles, which reached its peak in late August or September, i.e., intermediate between the two autumn movements of the Dunlin.

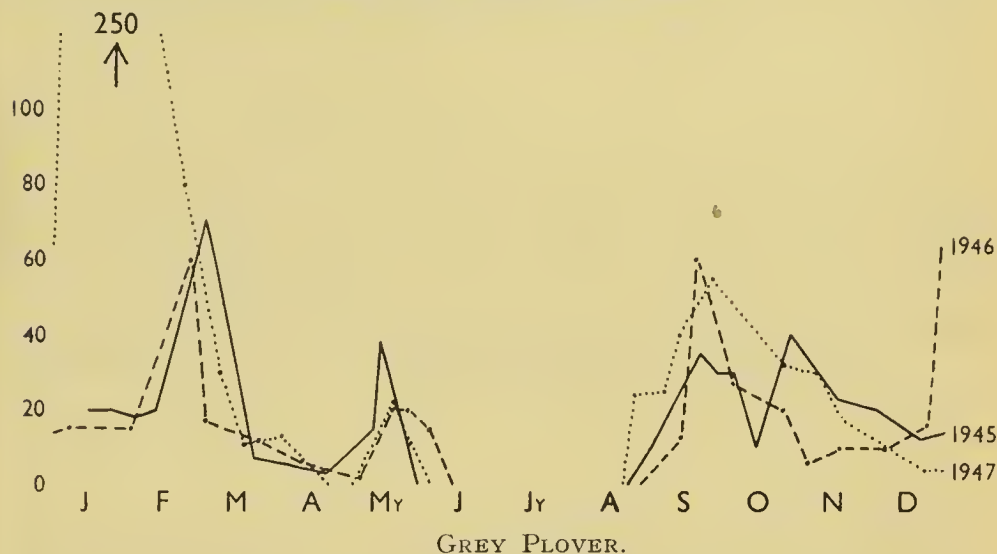
GREY PLOVER (*Squatarola squatarola*).

Usually in winter only a few small parties were seen on the mud-flats, but larger flocks of 50 or more were met with at the end of February and early March. This probably represented a gathering of English wintering birds in preparation for the sea-crossing to the European mainland which chiefly took place in March. In May smaller parties of up to 20 strong, and frequent pairs, made up the normal spring passage, which ended in early June.

Return passage commenced shortly after mid-August, was most marked in late September and was almost completed by mid-November. Only in 1945 was there any indication of a double autumn movement.

GOLDEN PLOVER (*Pluvialis apricaria*).

A much commoner bird than the Grey Plover, this species was regularly seen in winter in fields or on mud-flats, according to the state of the tide. The most striking point about the migration of the Golden Plover was the complete absence of a May passage on the coast, but I have seen, and heard of, large flocks on moorland at this season, suggesting strongly that the birds keep to more inland routes in making their way northwards.

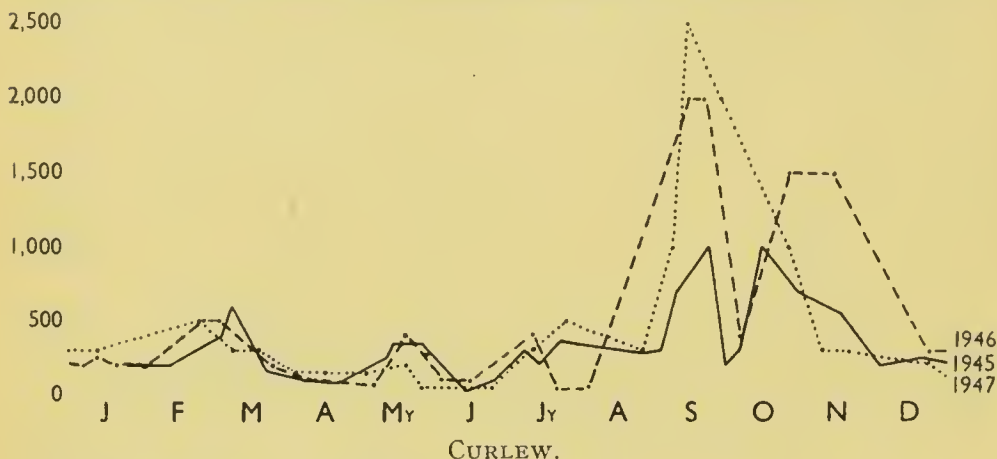


In each year the size and number of the winter flocks slowly declined throughout February, but in March there were occasional signs of passage in small numbers, often in pairs, and these paired birds were always of the Southern race in summer plumage. The wintering birds that were still present at this time had not acquired breeding plumage, so I cannot say to which subspecies they belonged.

As in the case of the Dunlin, the March influx may have resulted from a northward surge of wintering birds or, more probably, it was a passage of the Southern race superimposed on the winter residents. Only odd birds of the Southern race were seen on the shore after early April. By mid-July flocks of up to 100 had gathered on the Cheviot moorlands, but seldom more than 50 on the shore, though the numbers increased here to several hundreds by the end of the month. The majority of these undoubted birds of the Southern race (probably from North England and Scotland) passed on before mid-August, when the numbers were about half of those seen in July. However, before this departure was complete, a second much greater influx occurred, and from early September to mid-November the Golden Plover was one of the most abundant species on the slakes. This great wave was probably a double one because, in September and early October, those birds in summer plumage (about 12% of the total) belonged to the Southern race, though occasional adult pairs of the Northern race were seen, whereas in

late October and early November the only breeding dress in evidence was that of the Northern race.

I believe the explanation to be that the birds (Southern race) that had bred in Baltic countries had been overtaken by a wave of the Northern race from Arctic Europe. It may well be that this treble southward passage also occurs in the Dunlin, but in this case the double nature of the September-October passage is not evident because of the difficulty of distinguishing the subspecies.



CURLEW (*Numenius arquata*).

The movements of the Curlew somewhat resembled those of the Golden Plover which shares its breeding grounds. 200 to 300 were the numbers seen each winter, feeding on the mud-flats at low tide and resting in the fields at high tide. A distinct passage occurred in late February and early March and this wave passed on, leaving widespread pairs, exhibiting territorial behaviour, in the fields adjoining the coast. Like the Golden Plover, the main northward movement in May occurred inland, though there was a distinct, but small, coastal movement.

Small flocks, including young birds, collected on the coast at the end of June and in July, but the tendency was for these local breeding birds to move on before the main southward passage in September, October and early November. In each year a peak was reached in the second half of September and in 1945 and 1946 a second occurred about a month later. Thus in these two years a treble southward passage took place.

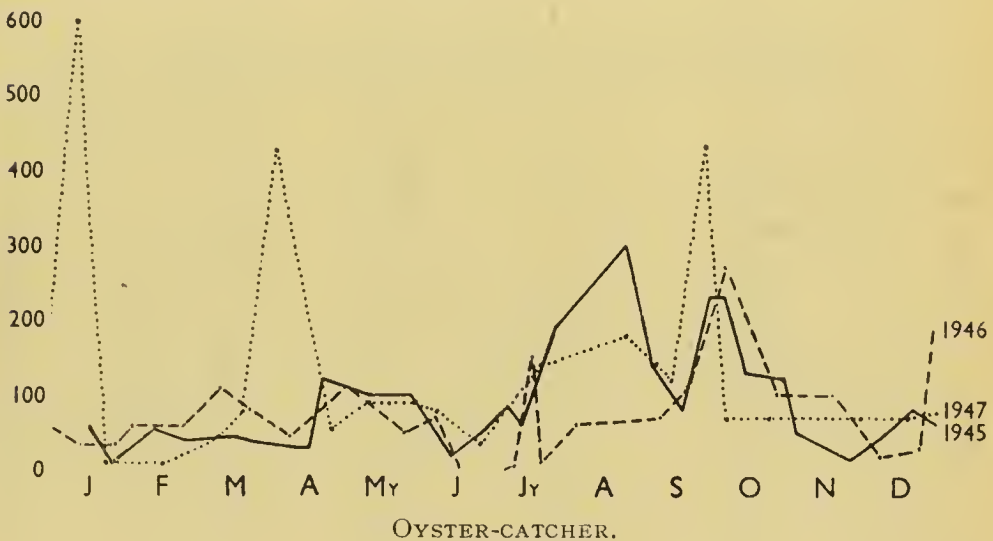
REDSHANK (*Tringa totanus*).

200 to 300 Redshanks spent the winter in my area, but their time of departure was obscured by the spring passage which began as early as mid-January in each year and continued till early May. In 1945 and 1947 there were indications of one main wave in late January and February and another in April, but in 1946 this second wave, if it occurred, was not observed. There were no signs of any influx in May.

A few pairs nest in the district and family parties were met with on the coast in June and July. These merged into larger flocks, and at first, when these gatherings were disturbed, they tended to split up into family parties. By the end of July, much larger flocks were present, the increase continuing to a peak in late August or in September. The passage birds usually made their departure before the main influx of waders during October, but in 1947 a second large influx took place in November. If this is to be regarded as a bad weather movement it seems strange that the only other species to be similarly affected was the Turnstone.

TURNSTONE (*Arenaria interpres*).

The fluctuations of this species in spring were similar to those of the Redshank—an increase in February, a decrease in March and, in each year in this case, the main passage in April, with stragglers passing through till early June. In 1945 and 1946, two major waves passed in autumn, one in early September and a second in late October, but, in 1947, Turnstone were scarce in September and did not attain their usual numbers till November.



OYSTER-CATCHER (*Hæmatopus ostralegus*).

This is one of the few waders which did not show a pronounced spring passage. The unusually large flocks seen in January and April in 1947 may have had some connexion with the severity of that winter. In 1946, fewer birds were seen in August than in July, but, apart from that, two main waves passed, one in August and another in late September and early October. Since numbers in autumn were (and still are) so much greater than in spring, it suggests that Oyster-catchers move north by an alternative route.

BAR-TAILED GODWIT (*Limosa lapponica*)KNOT (*Calidris canutus*).

Data for these species were scanty, but in each case there was a distinct suggestion of a double passage in spring, but not in autumn.

PURPLE SANDPIPER (*Calidris maritima*).

From mid-January the numbers diminished steadily, probably as a result of the wintering birds making their way northwards, but the passage of birds which had wintered farther south became noticeable throughout March and the first half of April. Almost all had departed by the end of April, not to reappear before the end of September, from which time the numbers rose rapidly throughout October and then more slowly to a peak about mid-January.

WHIMBREL (*Numenius phaeopus*).

This was purely a bird of passage. Throughout May they were common in small numbers, but I have no record of a Whimbrel in June. They were back again in the first few days of July, reaching a peak at the end of that month, after which they were again common in ones, twos and threes till the end of September, though odd birds lingered through October.

TABLE I.
SHOWING NUMBERS OF DUNLIN RECORDED.

1945			1946			1947		
Jan.	15	450	Jan.	7	450	Jan.	12	2,200
"	24	1,150	"	12	400	"	12	2,200
Feb.	4	700	"	20	400	"	18	200
"	12	1,050	Feb.	2	1,300	"	3	550
"	24	400	"	26	1,400	Feb.	24	1,300
Mar.	3	180	Mar.	2	700	Mar.	8	900
"	21	420	"	24	450	"	18	200
Apl.	7	170	Apl.	7	400	Apl.	3	550
"	21	200	May	5	50	May	2	350
May	10	140	"	18	1,000	"	18	3,000
"	13	1,200	"	18	1,000	"	25	12
"	26	6	June	3	50	"	25	12
June	13	2	"	15	30	June	12	25
"	25	4	"	20	2	"	24	6
July	7	3	July	13	30	July	10	12
"	13	20	"	20	200	"	24	800
"	22	1,000	Aug.	2	600	Aug.	25	200
Aug.	24	500	Sep.	14	600	Sep.	7	300
Sep.	2	600	"	20	600	"	13	100
"	9	300	Oct.	5	1,200	"	27	1,000
"	22	400	"	5	1,200	Oct.	25	1,200
"	29	800	"	25	250	Nov.	9	100
Oct.	5	800	Dec.	6	280	"	20	300
"	14	1,000	"	23	300	Dec.	22	280
"	29	1,000						
Nov.	17	500						
Dec.	3	450						
"	20	400						

TABLE II.
SHOWING NUMBERS OF RINGED PLOVERS RECORDED.

1945			1946		1947			
			Jan.	7	30			
Jan.	15	45	"	12	30	Jan.	12	30
"	24	45	"	26	40	"	22	10
Feb.	4	45	Feb.	3	70			
"	12	100						
"	24	120	"	24	70	Feb.	24	70
Mar.	3	90	Mar.	2	25	Mar.	8	70
"	14	50				"	18	45
"	24	10	"	21	70			
Apl.	7	7	Apl.	7	10	Apl.	3	20
"	21	70	"	30	5	"	24	5
May	10	20	May	5	30	May	2	165
"	13	200	"	18	150	"	18	380
"	26	300	"	24	100	"	25	300
			June	6	5			
June	13	25	"	18	—	June	12	10
"	25	5	"	20	1	"	24	7
July	7	8	July	9	—	July	10	3
"	13	20	"	16	15			
"	22	10				"	24	40
Aug.	24	130	Aug.	4	7	Aug.	25	45
Sep.	2	130						
"	9	80	Sep.	8	110	Sep.	7	130
"	22	220	"	20	80	"	13	10
"	29	200				"	27	10
Oct.	5	150	Oct.	5	160	Oct.	5	15
"	14	60						
"	29	50	"	25	90	"	22	90
			Nov.	3	60	Nov.	9	50
Nov.	17	20				"	20	40
Dec.	3	20	Dec.	7	10			
"	20	60	"	23	60	Dec.	22	30

TABLE III
SHOWING NUMBERS OF SANDERLINGS RECORDED.

1945			1946			1947		
Jan.	18	50	Jan.	12	30	Jan.	12	7
"	24	60	"	26	35	"	22	8
Feb.	12	40	Feb.	3	60			
			"	24	75	Feb.	15	75
Mar.	3	140						
"	14	70	Mar.	9	60	Mar.	8	40
"	21	25	"	21	—	"	18	40
Apl.	9	40	Apl.	7	35	Apl.	3	—
"	15	—						
"	21	—	"	30	—	"	24	11
May	10	65	May	5	—	May	10	120
						"	18	—
"	27	50	"	24	50	"	25	—
			June	6	400			
June	13	—	"	18	—	June	18	—
"	25	1	"	20	—	"	24	7
July	6	—	July	9	—	July	10	—
"	12	—	"	13	—	"	20	50
"	26	—	"	20	10	"	24	—
Aug.	24	6	Aug.	4	—	Aug.	25	160

TABLE III.—*continued*

1945			1946			1947		
Sep.	5	60	Sep.	8	—	Sep.	7	—
"	17	—	"	20	150	"	13	50
"	29	100	"			"	27	50
Oct.	5	—	Oct.	5	20	Oct.	5	—
"	14	10	"			"	22	5
"	18	20	"	25	3	"		
"	29	20	"			"		
Nov.	3	20	Nov.	18	25	Nov.	29	1
"	25	1	Dec.	23	10	Dec.	18	27
Dec.	8	6						

TABLE IV.

SHOWING NUMBERS OF GREY PLOVER RECORDED.

1945			1946			1947		
Jan.	15	20	Jan.	7	15	Jan.	12	250
"	24	20	"	20	13	"		
Feb.	4	18	Feb.	2	15	Feb.	24	80
"	12	20	"	26	60	Mar.	8	30
Mar.	3	70	Mar.	2	17	"	18	11
"	21	7	"	24	12	Apl.	3	13
Apl.	7	5	Apl.	11	6	"		
"	21	3	"			"		
May	10	15	May	5	2	May	2	—
"	13	38	"	18	20	"	18	22
"	26	5	"	24	20	"	25	11
"			June	3	15	"		
June	13	—	"	15	—	June	12	—
"	25	—	"	20	—	"	24	—
July	7	—	"			"		
"	13	—	July	13	—	July	10	—
"	22	—	"	20	—	"	24	—
Aug.	24	2	Aug.	2	—	Aug.	25	24
Sep.	2	10	Sep.	14	13	Sep.	7	25
"	22	35	"	20	60	"	13	40
"	29	30	"			"	27	55
Oct.	5	30	Oct.	5	27	"		
"	14	10	"			"		
"	29	40	"	25	20	Oct.	25	32
Nov.	17	23	Nov.	5	6	Nov.	9	30
Dec.	3	20	"	18	10	"	20	17
"	20	12	Dec.	6	10	"		
"			"	23	16	Dec.	22	4

TABLE V.

SHOWING NUMBERS OF CURLEW RECORDED.

1945			1946			1947		
			Jan.	7	200			
			"	12	250	Jan.	12	300
			"	20	200	"		
Jan.	24	200	Feb.	2	200	Feb.	24	500
Feb.	4	200	"	26	500	"		
"	12	200	Mar.	2	500	Mar.	8	300
Mar.	3	400	"			"	18	300
"	7	600	"	24	200	Apl.	3	150
"	21	160	Apl.	11	100	"	15	150
Apl.	7	100	"			May	2	150
"	21	80	May	5	55	"		
"	10	260	"			"		

TABLE V—*continued*

1945			1946			1947		
Apl.	13	350	May	18	400	May	18	200
"	26	340	"	"	"	"	25	50
June	13	12	June	3	100	"	"	"
"	25	100	"	15	100	June	24	50
July	7	300	"	"	"	"	"	"
"	13	200	July	13	400	July	10	300
"	22	360	"	20	40	"	24	500
Aug.	24	280	Aug.	2	40	Aug.	25	300
Sep.	2	300	"	"	"	Sep.	7	1,000
"	9	700	Sep.	14	2,000	"	13	2,500
"	22	1,000	"	20	2,000	"	"	"
"	29	200	"	"	"	"	27	2,000
Oct.	5	300	Oct.	5	400	"	"	"
"	14	1,000	"	"	"	"	"	"
"	29	700	"	25	1,500	Oct.	25	1,000
Nov.	17	550	Nov.	14	1,500	Nov.	9	300
"	"	"	"	"	"	"	20	300
Dec.	3	200	"	"	"	"	"	"
"	20	250	Dec.	23	300	Dec.	22	250

TABLE VI.
SHOWING NUMBERS OF OYSTER-CATCHERS RECORDED.

1945			1946			1947		
Jan.	15	60	Jan.	12	35	Jan.	12	600
"	24	12	"	26	36	"	22	10
Feb.	12	55	Feb.	3	60	Feb.	15	11
"	24	40	"	24	60	"	"	"
Mar.	14	45	Mar.	9	110	Mar.	8	40
"	21	40	"	27	80	"	18	80
Apl.	9	30	Apl.	7	45	Apl.	3	430
"	15	30	"	"	"	"	"	"
"	21	120	"	30	110	"	24	55
May	10	100	May	24	50	May	10	90
"	27	100	June	6	70	"	28	90
June	13	20	"	18	—	June	8	80
"	25	50	"	20	—	"	"	"
July	6	85	July	9	5	"	25	35
"	12	60	"	16	150	"	"	"
"	26	190	"	20	10	July	20	140
Aug.	24	300	"	20	60	Aug.	25	150
Sep.	5	140	Aug.	4	60	Sep.	7	140
"	17	80	Sep.	8	70	"	13	120
"	29	230	"	20	110	"	27	430
Oct.	5	230	Oct.	5	270	Oct.	5	70
"	14	130	"	"	"	"	"	"
"	29	120	"	25	100	"	22	70
Nov.	3	50	"	"	"	"	"	"
"	25	12	Nov.	18	100	Nov.	29	70
Dec.	8	45	Dec.	7	20	"	"	"
"	20	80	"	23	30	Dec.	18	70

Absence of data for some species on dates when other tables show that visits to the shore were made is accounted for by the fact that counts were taken most frequently along the coast from Berwick to Cheswick, the most accessible area for me. This was where the majority of the Ringed Plover, Sanderlings, etc., were to be found, whereas the numbers of some other species, such as Dunlin, were insignificant, since their main habitat was the mud-flats.

INLAND MIGRATION OF WADERS AND TERNS.*

BY

R. A. HINDE AND J. G. HARRISON.

SEWAGE farms and reservoirs provide particularly favourable conditions for the observation of the inland migration of waders and terns. The abundant food supply which they offer is very attractive to birds migrating across an otherwise largely unfavourable habitat, and their limited area usually makes observation relatively easy. Many such stations have been watched intensively for a long period, and there have been some attempts to compare the records from different stations for particular seasons : Hollom (1938) summarized most of the pre-1936 records and, more recently, Boyd (1947) and Glegg (1947) made observations at different stations during the spring of 1946. As far as we are aware, however, there has been only one previous attempt to compare observations made at different stations on a day to day basis. Harrison (1946) compared the results of a simultaneous watch on Guildford and Cambridge Sewage Farms throughout May, 1944, and found close agreement between the fluctuations in the total number of wading birds at the two stations. In the springs of 1947 and 1948 an enquiry aimed at extending this work was organized on behalf of the British Trust for Ornithology, and a number of observers made records of certain species of migrant waders and terns at sewage farms, reservoirs and other migration stations scattered throughout the country. The observations were confined to late April and May. In 1947 records were made at least once daily during the period April 23rd to May 31st at five stations, and, for varying proportions of this period, at sixteen other stations. In 1948 five stations were covered daily during the period April 18th to May 31st, and seventeen other stations for varying proportions of this period. A list of the observation stations, with the counties in which they are situated, is given at the end of this paper. We are very greatly indebted to all the observers who contributed records.

The majority of the stations at which observations were made were inland, but some records were obtained at coastal stations. In general the records from the different inland stations show much greater agreement with each other than they do with those from coastal stations. This is because the great majority of the birds seen inland were either actually on the move, or resting and feeding in between migratory flights, whereas many of the coastal birds were probably temporarily resident or engaged in only local movements. Many of the species which are found most often on the sea coast in this country probably seldom penetrate inland except when engaged in active migration. Also the inland stations are not subject to the effects of tides, and their small size usually made it possible for the whole area to be covered each day. The discussion in this paper refers primarily to the inland stations.

*A Publication of the British Trust for Ornithology.

The records show that the individuals of each species travel across the country either singly or in comparatively small parties, which move independently of each other. The view that the small parties seen at inland stations are fragments which have broken away from very large flocks flying high overhead, and which later rejoin other such flocks, can be dismissed : the small parties at inland stations can often be seen to arrive and depart independently, and their departure is usually preceded by a period of gradually increasing excitement which could not be dependent on the approach of a high-flying flock. In some species small parties of this type are recorded at random throughout the whole of the migration season, but in the majority of cases the greater part of the passage is concentrated into one or more periods each of only a few days duration. The term wave is used here to describe such a movement of a number of independent parties passing through within the course of a few days. For example, in 1948 there were 38 inland records of Sanderling (*Crocethia alba*) referring to over 150 birds ; of these, 26 records, comprising about 125 birds, were made between May 17th and 24th.

The peak date, that is the date on which the maximum numbers were recorded at each station, usually corresponds very closely for stations all over the country, and it is rarely possible to detect any significant difference between stations in the north and south of the country. In some cases, however, waves which were recorded at the majority of stations in the west of the country were almost absent in the east, and vice versa. Thus in 1948 an exceptionally large passage of Black Terns (*Chlidonias niger*) took place between May 16th and 22nd ; the peak date was May 18th in the western and northern midlands, but May 21st in the south-eastern counties. We thus get a picture of migration proceeding in waves extending over a broad front in space and over several days in time : the differences which are sometimes seen between the east and west of the country show that the front, though broad, is limited, and that there is often a concentration of parties in the centre and relatively few on each wing.

In order to discover to what extent these waves of migrants are a constant feature from year to year, an analysis was made of the observations from Cambridge Sewage Farm, as published in the reports of the Cambridge Bird Club, 1929 to 1946. A similar analysis of observations from Oxfordshire, Berkshire and Buckinghamshire, as published in the reports of the Oxford Ornithological Society, 1915 to 1947, was also made. It should be noted that, in the case of a species whose passage in any one year is normally concentrated into one or more waves, the existence of the waves will tend to be obscured in an analysis covering several years, owing to the slight changes in the date of the peak days from year to year.

In spite of this it was found that there were many points of agreement between this analysis of past years and the results of the

1947-8 enquiry. Some species, such as the Sanderling, were recorded in 1947-8 in very clearly defined waves : the great majority of the previous records of these species are confined to short, well-defined periods. On the other hand the 1947-8 records for some species, such as Curlew and Whimbrel, were scattered throughout the whole of the period of observation : it is just these species for which the records in previous years show no regularity. Still other species were intermediate between these two conditions, small numbers being seen throughout the period, but the greater part of the passage being confined to one or more fairly clearly defined waves (e.g., Dunlin, Common Sandpiper). The peak dates of these waves show a close correspondence from year to year.

The evidence thus shows that there are considerable differences between the yearly patterns of the migrations of the different species : these can be correlated with two other factors in their biology :—

(i) The date of the peak of the passage varies with the breeding-season of the various species concerned. Thus the passage of the Bar-tailed Godwit (breeding-season last week of May or early June onwards) is usually later than that of the Black-tailed Godwit (breeding-season end of April through May in Europe, end of May and early June in Iceland). The Little Stint (breeds last week of June and first half of July) and Temminck's Stint (latter half of June and July), pass through later than the majority of the Dunlin (second week of May onwards). The Sanderling breeds in Greenland from June 20th onwards, and passes through much later than the Ruff, which starts to breed in the second week of May. There is, of course, a general relation between the breeding-season and the latitude of the breeding range ; species breeding in high latitudes tend to do so later than those nesting in more temperate regions. What we see in the British Isles in spring is, therefore, the passage of a sequence of species, each of which breeds farther north than the preceding one—though of course the sequence is much complicated by other factors.

(ii) The length of the period during which individuals are seen on migration through the British Isles is correlated with the extent of the breeding range in a north-south direction. Those species whose breeding range is restricted in latitude, such as the Sanderling and Bar-tailed Godwit, usually have a comparatively short period of passage. On the other hand, those species whose passage through the country is spread over a long season are those with a breeding range more extensive in latitude. In the latter case the passage as seen in the British Isles is probably a sequence of individuals or parties, each of which will breed farther north than the preceding one.

There were considerable differences in detail between the passages in 1947 and 1948. For instance, the waves of Dunlin, Common Sandpiper, Ringed Plover and Common and Arctic Terns at the

end of April and beginning of May, were several days later in 1948 than in 1947, and an exceptional passage of several species took place between May 16th and 22nd, 1948.

The records for each species are summarized below as follows : I. Summary of records from the Cambridge Bird Club reports 1929-1946. II. Summary of records from the Oxford Ornithological Society reports 1915-1947. III. Summary of results of the 1947 enquiry. IV. Summary of the results of the 1948 enquiry. The summaries refer only to the periods (see above) during which co-ordinated observations were made. The counties in which the stations of observation are situated are given at the end of the paper.

BAR-TAILED GODWIT (*Limosa lapponica*).

Cambridge.—At least 21 birds have been recorded at the sewage farm on 11 occasions in 6 years : of these, 20 birds on 10 occasions were first seen between April 29th and May 11th, and 16 birds on 8 occasions between April 29th and May 5th. Of 7 birds seen at neighbouring fens, 6, in 2 years, were between April 29th and May 11th. In 1932 birds were heard over the town 3 times, single birds on April 20th and May 13th and very large numbers on May 1st.

Oxford.—Thirteen birds recorded on 9 occasions in 8 years, all between April 25th and May 10th : of these, 6 birds on 6 occasions in 5 years were between May 1st and 5th. In 1932 birds were heard three times on April 30th.

1947.—Only one inland record—one at Eccup on May 3rd. Birds were recorded at Spurn from April 25th, and at Pennington, Pagham and Alnmouth at the beginning of May : the main passage took place at this time. Spurn showed a second increase in numbers on May 9th.

1948.—Two inland records—one at Northampton on April 21st-22nd and one at Cambridge on April 28th-May 2nd. At the coastal stations the main passage took place in the first fortnight of May, though some flocks were reported on the Exe estuary later in the month. Two were reported at Dale Fort on May 1st-4th, 9th and 13th and one on the 31st. There was one at Skokholm from May 9th to 12th. There were several parties on the Exe estuary from May 2nd-6th, 17 on the 13th, 12 on the 18th and 4 on the 29th.

BLACK-TAILED GODWIT (*Limosa limosa*).

Cambridge.—Ten birds have been seen, mostly in the second half of April or beginning of May.

Oxford.—The majority of the records were made in the last ten days of April, though in some years birds were recorded earlier in the year. Only two single birds have been recorded after May 6th.

1947.—The only inland records were at Altrincham and Astley. Both had 6 arrivals on April 25th : those at Altrincham had left the next day, but Astley had 6 more. Amongst the coastal stations, 4 birds were recorded at Spurn on April 26th. None were recorded in the first part of May, but there were two coastal records for later in the month—30 at Pagham on May 24th and one at Skokholm on May 25th.

1948.—The only large parties were seen on the Exe estuary between May 18th and 29th. (This station was not covered during the early part of the period of observation). Amongst the inland stations, Northampton had 2 birds on April 18th and 2 on May 23rd. Four birds were recorded at Astley on April 30th and smaller parties on most days during the next fortnight. Guildford had one bird on May 11th and one on May 21st. L. Carra, Co. Mayo, had single birds on May 27th and 29th.

CURLEW (*Numenius arquata*).

Cambridge.—Seen on various dates throughout the spring, but no migrants seen after May 11th.

Oxford.—Parties have been recorded throughout the whole migration period, but the records are difficult to interpret owing to the possibilities of confusion with locally breeding birds.

1947.—Results probably confused by non-migrating birds, but there are indications of two waves at nearly all stations which had any Curlew records at all, one at the beginning of the period of observation and one on about May 10th.

1948.—Records confused by local birds.

WHIMBREL (*Numenius phaeopus*).

Cambridge.—Most of the birds recorded were seen in the last week of April or first fortnight of May.

Oxford.—The records are scattered from the end of April to the end of May.

1947 and 1948.—The records for both years show a continuous passage of small parties throughout the period, but few were recorded inland. In 1947 the main passage began at the end of April and continued until about May 20th. In 1948 it began at the beginning of May and continued until the end of the month. In 1948 the peak date at L. Carra, Co. Mayo, was May 7th, the same as that for the Exe estuary and within a few days of that for other English stations.

TURNSTONE (*Arenaria interpres*).

Cambridge.—No April records. Principal passage seems to occur in the first three weeks of May, but there are some records later in the month.

Oxford.—14 birds have been recorded on 9 occasions in 9 years: the dates range from April 25th to June 3rd, but 5 birds in 3 years were recorded on May 16th or 17th.

1947.—Coastal stations recorded fluctuating numbers throughout the whole period, but, with the exception of a flock of 200 birds at Pagham on April 24th, the main passage occurred between May 5th and 27th. The inland records were as follows: Wigan, one on April 23rd; Tring, one on May 6th; Northampton, one on May 8th and 3 on May 9th; Leigh, one on May 8th and one on May 19th; Nottingham, one on May 23rd and 24th and 3 on May 25th.

1948.—Birds were recorded on the island of Skokholm throughout the whole period. At Dale Fort there were up to three birds on May 11th to 18th and up to 8 on May 26th to 28th. The inland records were as follows: Cambridge, one on April 27th; Loughborough, one on April 28th; Tring, one, and Cambridge, three on May 2nd; 24 records at 7 different inland stations, referring to approximately 40 birds, were made between May 9th and 22nd. Two birds were recorded at Leigh on May 29th and one on May 31st.

KNOT (*Calidris canutus*).

Cambridge.—Have been recorded on five occasions, three of which in three years were on May 8th or 9th, one on May 27th and one on June 3rd.

Oxford.—Recorded on 4 occasions—April 8th, 15th, May 10th and 11th; the last two records were at different stations but in the same year.

1947.—No inland records. The principal coastal passage took place between April 25th and May 7th. Spurn showed a further movement on May 12th and 13th, and Spurn and Pagham on May 17th-19th.

1948.—Eleven at the Exe estuary on May 5th. There were three inland records—Cambridge, one on May 12th; Eye Brook, one on May 17th; Witton Flashes, one on May 19th.

DUNLIN (*Calidris alpina*).

Cambridge.—Small parties are usually seen throughout the migration season up to the end of the first week of June. In 6 out of the 8 years for which adequate information is available, a peak was reached between April 26th and May 8th. In 6 years a later, much smaller, peak was reached within a few days of May 20th.

Oxford.—Occurs throughout the whole migration season, but the peak of the passage is almost invariably reached between April 26th and May 3rd. In some years there are indications of a second, much smaller, wave within a few days of May 15th.

1947.—April 25/26th brought a significant influx of Dunlin to Pagham, Spurn and Alnmouth amongst the coastal stations and to Cardiff, Northampton, Eccup, Marbury, Altrincham, Astley and Leigh amongst the inland stations. The peak numbers were seen at this time at all stations except Alnmouth where

the peak was two days later, and Skokholm, where no birds were seen at this time. The numbers reached 120 at Astley and 30 at some other inland stations. They fluctuated considerably during the next few days. Smaller parties were recorded up to the end of the month. It is interesting to note that the large passage at the end of April was almost unrecorded at Cambridge, where only a single bird was seen, but the above analysis of the records of previous years shows that a wave is usually recorded at Cambridge at this time.

1948.—Considering first the group of 3 east midland inland stations for which full records are available—Tring, Cambridge and Northampton—all had small parties during the latter part of April, increasing during the last few days of the month. All three show a very high peak on May 2nd, when numbers reached 16 at Tring, 73 at Cambridge and 41 at Northampton, and small parties were recorded during the next few days. A second, though much smaller, wave was recorded on May 11th at Tring and Cambridge (3 and 7 birds respectively) and on May 12th at Northampton (21 birds). With the exception of 20 birds at Northampton on May 15th, the next few days brought only small numbers, but there was a third peak on May 24th at all three stations (11 birds at Tring, 5+ at Cambridge and 20 at Northampton) and some passage continued until the end of the month. Eye Brook and Loughborough can be considered together and show a similar picture to that at the above three stations. The first peak was recorded on May 2nd (50 birds at Eye Brook): the rest of the month was not very fully covered, but there are indications of a second wave at Eye Brook on May 16th and a third on May 23rd. Staines and Barn Elms recorded peaks of 18 and 5 respectively on May 2nd, but were inadequately covered later. The figures for the Exe estuary fluctuate wildly—this may be due to the movement up and down the estuary of temporarily resident birds. At Dale Fort there was a peak of 9 on May 2nd; numbers then fell off, but about 60 were seen on May 9th-12th. A fairly continuous passage was seen for the rest of the month, with peaks of 50 on May 16th and c.25 on May 22nd and 25th. The Lancashire and Cheshire stations recorded rather larger numbers in the last week of April than did the more easterly stations—Astley had 16 on April 24th and Leigh 30 on April 28th. A subsidiary maximum was recorded on May 2nd with further parties in the next few days (Astley had 28 on May 6th). Records for the rest of the month are not very complete, but Astley had small influxes on May 11th and 24th-27th. At L. Carra the passage during the first part of the period was similar to that in England—a peak of 21 on May 2nd and a moderately heavy passage on May 10th-17th: records for the rest of the month are inadequate.

LITTLE STINT (*Calidris minuta*).

Cambridge.—Has been recorded only 4 times—April 14th, May 25th, June 4th and 6th.

Oxford.—Three birds have been recorded in three different years on May 12th, 13th and 24th.

1947.—Four at Nottingham on May 12th and one on the 16th were the only inland records. Two at Pagham on May 19th and about ten at Spurn, May 24th-26th.

1948.—Poyle Gravel Pits, Middlesex, 2 on May 10th; Cambridge, one on May 11th, 4 on May 16th, one on May 18th, one on May 27th; Tring, one on May 26th.

TEMMINCK'S STINT (*Calidris temminckii*).

Cambridge.—Ten birds recorded in five different years. All were between May 16th and June 3rd.

Oxford.—Three birds have been recorded in three different years on April 28th, May 24th and 26th.

1948.—Northampton, 3 on May 2nd; Eye Brook, one on May 16th and 17th; Cambridge, one on May 18th and 19th; Loughborough, one on May 20th and 21st.

SANDERLING (*Crocethia alba*).

Cambridge.—Birds have been seen throughout May and the first few days of June, but out of the 36 birds which have been recorded in 9 years, 22 birds

in 5 years were seen between May 17th and 19th, and 8 more between May 20th and 28th.

Oxford.—Twenty-five birds have been recorded on 14 occasions in 8 years. 19 birds on 7 occasions were between May 15th and 19th, and 22 on 11 occasions between May 13th and 27th.

1947.—Spurn reported a series of small parties up to May 13th. Alnmouth had 9 on May 16th and 7 on the 18th. Pennington had 18 on May 18th. The inland records were : Tring, one on May 14th ; Cambridge, 3 on May 19th, one on May 21st ; Leigh, one on May 27th and 28th.

1948.—A much heavier inland passage than usual took place in 1948. There were 38 inland records referring to over 150 birds ; of these, 26 records of c. 125 birds were made between May 17th and 24th. The peak occurred on May 18th.

RUFF (*Philomachus pugnax*).

Cambridge.—Have been recorded at practically all seasons of the year, but spring migrants have been seen rather more frequently during the second week of May than at other times.

Oxford.—Records throughout the season, but rather more in April than in May.

1947.—Northampton, one on April 29th ; Cambridge, one on May 3rd ; Northampton, 12 on May 4th.

1948.—The inland passage was divided into two distinct waves. On April 18th (the first day on which observations were made) there were 5 birds at Astley, 4 at Worsley, Lancs., and 11 at Northampton. Northampton recorded smaller numbers during the next week. No further birds were seen until May 15th. This date marked the start of a wave which lasted until May 25th, with a peak on May 19th-20th. During this period 6 of the inland stations recorded a total of at least 29 birds.

COMMON SANDPIPER (*Actitis hypoleucos*).

Cambridge.—This species, which, unlike most of the other waders, does not feed in flocks in the centre of the sewage beds, but usually remains singly or in small parties on the edges, is the most difficult of all waders to count at inland stations. The records show that the principal passage takes place during the last week of April and first fortnight of May. The peak dates have only been recorded for five years : they are :—May 8th, 9th, 8th, 12th, 8th. The records of a few years show indications of a second, much smaller, wave passing through within a few days of May 20th.

Oxford.—The records are difficult to interpret as some may refer to birds breeding near by. Birds are seen from the middle of April to the end of May, but most records refer to the last ten days of April and the first ten days of May.

1947.—Two waves passed through during the period of observation ; both brought influxes to nearly all stations. The first, between April 25th and 30th, was most marked at stations in the west of England. The peak was reached on April 25th at Cardiff (19 birds) and Tring (6 birds), and two days later at the more northerly stations (9 birds at Eccup, 30 at Wigan, 7 at Astley, 4 at Leigh). The second wave was seen principally at the east midland inland stations between May 4th and 12th. At Cambridge the numbers reached 11 on May 8th and at Nottingham 12 on May 10th. At Pennington, Erlestone and Tring the number of birds seen during each of the two waves was about the same. At Northampton and Cambridge the second wave definitely brought more birds than the first. At Tring and Cambridge there was a further, very small wave between May 23rd and 25th.

1948.—Very few birds were seen at the more westerly stations in this year. In the remaining stations two quite distinct waves were seen. The first reached its peak between April 29th and May 3rd—the largest numbers being 12 at Barn Elms on April 29th and 14 at Cambridge on May 2nd and 3rd. The second wave reached its peak between May 17th and 21st, and brought considerably more birds than the first—Eye Brook had 25 on May 17th, Cambridge 35 and Guildford 18 on May 20th.

GREENSHANK (*Tringa nebularia*).

Cambridge.—The great majority of the records are between April 28th and May 14th.

Oxford.—The great majority of the records are scattered between April 30th and May 20th, with rather more in the first fortnight of May than later.

1947.—Nine records, seven of which were inland, all between May 4th and 17th.

1948.—Very few birds were seen before the middle of May. The major part of the passage took place in the ten days following May 15th, reaching a maximum on May 18th, on which date a total of 13 birds were recorded at 5 inland stations.

RINGED PLOVER (*Charadrius hiaticula*).

Cambridge.—Not very adequately recorded. It is clear that there is usually a maximum in the latter part of May, and in many years there is also one at the beginning of the month.

Oxford.—Has been recorded throughout the period.

1947.—Two waves passed through. The principal movement took place between April 25th and May 1st; comparatively large numbers were seen at this time at most stations. The largest parties seen inland were 40 on April 26th at Astley and 30 on April 29th at Northampton. May 3rd and 4th brought another movement to Northampton, Nottingham and Astley, which it is possible may be regarded as a subsidiary one to the first. Some small parties were seen at scattered points during the next few days. The second movement, which was much smaller than the first, took place between May 23rd and 26th. It was seen at Pagham and Alnmouth, and inland at the east midland stations.

1948.—A few birds were seen during the first ten days of the period, rising to a small peak on April 28th and 29th, when there were 7 at Cambridge and 6 at Northampton. The number of birds seen each day fell off after May 2nd until May 9th-12th, when there was a second, slightly larger arrival, the peak being on May 12th (Cambridge 16 and Northampton 13 birds). The principal passage took place in all districts between May 17th and the end of the month, the peak numbers being recorded at nearly all stations between May 18th and 20th (Eye Brook 30 birds and Astley 13 on May 18th, Cambridge 9 and Northampton 22 on May 20th). Unlike the previous year, the first wave was apparently poorly represented in Cheshire and south Lancashire, though the second wave brought more birds through this area and the third brought more again.

GREY PLOVER (*Squatarola squatarola*).

Cambridge.—In one year 17 birds were recorded on April 24th. Birds have been recorded between May 1st and 10th four times, and between May 22nd and June 6th seven times.

Oxford.—Six have been recorded on 5 occasions in 5 years. One of these was on April 12th, the other five all between May 16th and 26th.

1947.—The coastal records were scattered throughout the whole period. The inland records were : Northampton, one on May 4th ; Cambridge, one on May 23rd and 24th.

1948.—The coastal records were : Exe estuary, 4 on May 19th and 3 on May 27th ; Dale Fort, 4 on May 10th and one on May 19th. The inland records were : Guildford, 2 on May 7th and 8th ; Cambridge, 2 on May 16th ; Eye Brook, one on May 15th and 2 on May 18th.

BLACK TERN (*Chlidonias niger*).

Cambridge.—Many years show two distinct waves, one in the first ten days of May and one in the last ten days. In some years one or other of these waves is not shown by sewage farm observations but by observations at neighbouring fens. Records in the middle of the month are less frequent except as stragglers from, or forerunners of, one of the main waves.

Oxford.—A few records for the last ten days of April. The majority of the records refer to May 2nd to 12th. Of the 6 records between May 13th and 18th, three were made in a single year. In some years there is apparently a second wave after May 20th.

1947.—Very few were recorded, but the passage seemed to take place in two waves. Birds were recorded at Pagham, Nottingham, Tring, Marbury and Leigh between May 4th and 11th, all except one being between May 4th and 8th. Single birds were recorded at Erlestoke, Tring, Cambridge and Nottingham between May 22nd and 25th. None were recorded between May 12th and 21st. The only other record was April 29th at Northampton.

1948.—A few scattered birds were reported from all areas during the first part of the period, but practically the whole passage took place between May 16th and 21st, when exceptionally large numbers were reported at many stations. This passage has been described in a separate paper (Hinde, 1949).

COMMON AND ARCTIC TERNS (*Sterna hirundo* and *S. macrura*).

These two species have been plotted together as specific identification was often not made.

Cambridge.—Most of the records refer either to the first, or to the last, ten days of May.

Oxford.—The majority of the records occur between the end of April and May 11th. There are very few records between May 12th and 18th, but a number between then and the end of the month.

1947.—A large passage took place between April 22nd and May 1st at all stations. The peak occurred on April 25th/26th. This has already been fully described by Gibb (1948).

1948.—Except for a few scattered birds the records are grouped into two waves—one fairly small wave between May 4th and 8th at south-east midland stations (largest flock 10 at Tring on May 4th) and another between May 16th and 23rd recorded principally at the south-east midland stations, and rather larger than the first. At Tring there were 24 birds on May 18th and 29 on the 21st; at other stations there were up to 7 birds. At L. Carra the first wave was not recorded, but several parties were seen in the week following May 10th, the rest of the month being inadequately covered.

LITTLE TERN (*Sterna albifrons*).

Cambridge.—Recorded three times, May 2nd, 6th and 9th.

Oxford.—Twenty-eight have been recorded on 17 occasions in 14 years, all between May 3rd and 20th, with the exception of one on April 27th.

1947.—The inland records were: Marbury, one on April 24th, 25th and 29th; Tring, 3 on May 6th, 5 on May 7th and 6 on May 8th; Cambridge, 2 on May 9th; Nottingham, one on May 25th.

1948.—The inland records were: Cambridge, one on May 7th, 13th, 18th and 3 on the 19th; Tring, 2 on May 18th and 21st; Eye Brook, 2 on May 18th; Guildford, 3 on June 5th.

The evidence which has been presented is scanty, and represents only the first stages in the analyses of the migrations of these species. Its interpretation is rendered difficult by the possibilities of confusion with non-breeding, only partially migratory, birds. A number of interesting questions are raised, which cannot be answered with the present evidence. For example, we have seen that there are some species in which the passage is limited to one or more distinct waves, and some, like the Dunlin, in which birds are recorded throughout the whole of the migration season, but in which the majority of the individuals pass through in definite waves: to what extent are these waves merely the product of fluctuating meteorological conditions, and to what extent are they composed of individuals with different physiological constitutions, whose migratory behaviour is released or influenced by different levels of environmental conditions? If the latter, do the waves form different breeding populations, and what degree of isolation is there between

them? Or is it possible that the different waves contain individuals of different sex or age?

In any case it is clear that broad generalizations on the migration of waders and terns rest on an insecure foundation. Each species or subspecies must be considered separately against a background of its whole biology. Moreover it is as unsatisfactory to describe the passage of a species by giving the dates of the first and last individuals, as it is to describe the variation in wing-length of a series of specimens by giving the measurements of the smallest and largest. The period of passage of a species should be described by giving the date or period during which the greatest number of records were obtained, and the grouping of the other records about this.

Meteorological factors may act on a migrant bird externally or internally. In the first case they affect directly the ground-speed of the bird: thus, wind conditions may accelerate or retard it, or deflect it from its track. In the second, they produce or influence physiological (and/or psychological) changes in the bird—that is they influence the building up and release of the migratory urge. We must imagine an increasing internal 'migration-energy' acted upon by external climatic factors which may both increase that energy and release it in action when a certain threshold, dependent on both the internal energy and the external conditions, is reached. The date of arrival of migrants is thus to some extent dependent on all the environmental conditions along the whole of the route. It is therefore unlikely that we shall be able to trace a simple and invariable relationship between one or a few environmental factors and the peak dates for the different species; but it is generally agreed that temperatures and wind play a leading role. Although the waves of migrants may frequently arrive under certain pressure conditions, (the 1948 Dunlin waves do, in fact, all occur just after a period of low pressure), this is more likely to be due to the associated wind and temperature conditions, than to the bird's sensitiveness to pressure changes.

The results of two years work provide inadequate material on which to base any conclusions on the effect of weather. A comparison was, however, made between the observations and the weather over Spain, Portugal, France, the Bay of Biscay and southern England. The principal points which emerged are given below:—

(i) The waves of Dunlin, Common Sandpiper, Ringed Plover and Common and Arctic Tern at the end of April and beginning of May, were several days later in 1948 than in 1947. In 1947 there were persistently high temperatures in Spain and southern France between April 18th and 27th; but in 1948 temperatures were much lower during this period, and comparatively warm weather was not recorded until the 27th.

(ii) An exceptional passage of several species took place between May 16th and 22nd, 1948. Temperatures had been unusually high in Spain on May 14th and in France on May 15th—

18th. During the period of passage conditions were more or less calm over south France and Spain, but there were north-easterly winds over the British Isles.

(iii) Waves of migrants may pass through with either favourable or contrary winds. Gibb (1948) showed that the passage of Common and Arctic Terns in April, 1947, coincided with south-westerly gales: these gales did not affect Spain and southern France, and so cannot have accelerated the passage of birds from the south; but they may have been instrumental in bringing in birds which normally migrate to the west of this country. In this case therefore we can distinguish the internal and external effects of meteorological factors:—the high temperatures, referred to in (i) above, were to some extent responsible for the fact that the birds were actually on the move at this time, and the gales blew them eastward, so that they were recorded at inland stations. Strong contrary winds may prevent migration: when the wind veered from west, to blow with gale force from the north-east, at the beginning of May, 1947, the passage of Common and Arctic Terns, Dunlin, Common Sandpiper and Ringed Plover ceased.

The observations in the 1947-8 enquiry were made by the following, to whom we would like to express our thanks. Many of them worked very hard in making regular visits to the observation stations.

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DEVON. Exe Estuary, L. A. Harvey, S. D. Gibbard, E. H. Ware, Dr. Bolderston, S. C. A. Hunt.

WILTS. Erlestoke Lake, Dauntsey's School Bird Trust *per* J. G. Haworth.

HANTS. Pennington—Lymington, E. Cohen.

SUSSEX. Pagham harbour, Miss V. Maxse.

SURREY. Guildford Sewage Farm, G. A. Hebditch. Great Frensham Pond, Miss P. M. Bond. Barn Elms res. and other stations, H. Bentham, H. A. Craw, P. W. E. Currie, H. F. Greenfield, E. Hunter, P. A. D. Hollom, G. C. Low, F. J. L. Mitchell, D. A. T. Morgan, D. F. Owen, B. A. Richards, R. H. M. Ryall, C. Ashby.

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GLAMORGAN. Llanishen res., Cardiff, Bruce Campbell, J. D. R. Vernon.

PEMBROKESHIRE. Skokholm, Miss Keighley, P. Conder. Dale Fort, J. H. Barrett.

LEICESTERSHIRE. Eye Brook and Loughborough res., Leics. and Rutland Orn. Soc. *per* F. A. Bak.

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DERBY/CHES. Little Don res., C. Hodgkinson.

DERBYSHIRE. Shipley res., F. S. Lee.

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Co. MAYO. L. Carra, R. H. Rutledge.

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PASSERINE MIGRATION THROUGH ENGLAND

BY

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THE present paper describes a spectacular migration proceeding through the middle of England for every ornithologist to see—yet until now it has been unrecorded. Credit for the present discovery must go to the Dutch workers, who during the last decade have discovered and analysed the causes of the concentrated stream of diurnal migration which proceeds along the shore of



DIRECTIONS TAKEN BY OCTOBER MIGRANTS

the Zuider Zee in autumn. The rest follows from a study of the map of England.

The cause of the concentrated migration-stream south along the edges of the Zuider Zee is that the main direction of passerine migration across Holland in autumn is south-west, and when these birds reach a north-south barrier, such as the sea, they tend not to cross it, but to turn and fly along it. As a result, a concentrated stream can be seen near the southern end of the barrier. The important theoretical implications of this study need not concern us here (see Tinbergen, 1941; van Dobben, 1944). The sea is not the only feature that may act to deflect migrants, and the present

enquiry was in fact prompted by the deflecting effect of hills, as shown to the senior author by Mr. S. Durango near Stockholm in September, 1948.

Once one has seen diurnal migration, it is easy to recognize, and in previous autumns we had not infrequently seen Skylarks (*Alauda arvensis*) and other species migrating over Oxford between south and west. It occurred to us that the Berkshire Downs, which run east and west, and to a lesser extent the Chiltern Hills, which run N.E.-S.W., might act as barriers to these migrants, in which case a concentrated stream of migrants might be expected against their escarpments. These streams would be composed of migrants flying between south and west which had been deflected more to the west on meeting the hill barrier.

The above prediction was in fact realized, and the place first selected from the map as suitable, namely the bare slopes at the foot of White Horse Hill in Berkshire, proved ideal. Between 07.05 and 08.50 G.M.T. on October 20th, for instance, there streamed past us 1540 Chaffinches (*Fringilla caelebs*), 205 Starlings (*Sturnus vulgaris*), 57 Skylarks (*Alauda arvensis*) and small numbers (under 20) of seven other passerine species. This was the best day, but several others were good, and it is likely that we missed the peak, as we paid no visits to this point between October 6th and 20th, as we were then exploring other places. Migration along the Chiltern escarpment was similar, but on a smaller scale. It is remarkable that so strong a movement should have been undetected all these years, but three factors may have contributed to this: first, the migration is probably much stronger in the early morning than at other times of day; secondly, it is probably much stronger in October than in any other month, and most ornithologists do not think of October as a "good" month for bird-watching; thirdly, the front is a narrow one, and unless the observer is in exactly the right place, he may easily overlook the movement.

The present observations, made in spare time between October 6th and 29th, 1948, merely introduce the problem in the hope that others will study it in detail, both along the barriers discussed here and along others, and also where there are no barriers. For a detailed study, visits should be made every day, in all weathers, and at all times of day, and to a variety of places. We at the Institute are primarily concerned with population problems, and have not time to do this.

Time of day. On the poor days, migration seemed almost confined to the first hour or two after sunrise. It continued much longer on the good days, but we could not stay to see it terminate. We did not try the evening, when some coastal watchers (Bannerman, 1944) have recorded a smaller-scale resumption of flight. On mornings when both Chaffinches and Skylarks were migrating, the Skylarks reached peak numbers appreciably later in the morning than did the Chaffinches.

Weather. We did not go out on days of heavy continuous rain, but migration was observed alike on warm, mild days, on fine, still and very cold days, on days with very strong winds and during fairly heavy showers.

Wind. Migration occurred under most varied wind conditions, on a still day, with light east and south-east wind, with north-westerly wind of moderate strength, and with a south-westerly gale. In all cases, the main direction of the migrants was west at the White Horse, and south west along the Chiltern escarpment, i.e., there was no tendency for the migrants to fly against the wind.

Height. With a light tail-wind, the migrants flew high, some of them being too high to be identified. None, however, were really difficult to see, so we do not think that others were passing too high to be visible. Incidentally, the problem of identification is a novel one, since all that one sees is a silhouette of birds flying high : but some, notably the Skylarks, call as they go, while a few of the Skylarks were singing lustily. With a head wind, the migrants flew much lower, and in the teeth of a westerly gale, the Chaffinches were breasting a small rise like driven grouse. We have no reason to think that any Chaffinches crossed over the downs, though when we were standing at Uffington Camp, at 660 feet a.s.l., one Chaffinch was flying west only a little below us. Some of the Skylarks appeared to cross over the top of the downs, though most of them certainly flew west along the escarpment. On any one day, most of the Skylarks flew higher than most of the Chaffinches, but Chaffinches with a tail wind flew higher than Skylarks with a head wind.

Direction. Casual observations in Oxford town, where the migrants were presumably not deflected, showed that in early October Skylarks tended to pass a little west of south, in mid-October Chaffinches travelled mainly south-west, and at the end of October Starlings moved nearly due west. At the White Horse, the vast majority of migrants of all species travelled due west, some south-west and a few rather north of west. Those going a little north of west were chiefly Chaffinches, which tend to fly towards and over belts of trees, so this was evidently a purely local deflection, due to the location of woods on the route. Some of the Skylarks flew rather uncertainly, and their direction was difficult to determine, and on several occasions we saw them travelling south-west until they met the downs, when they gradually turned due west. At Beacon Hill (Oxfordshire) and near Watlington, both on the Chiltern escarpment, the main direction was south-west. At Beacon Hill with a strong south-west wind, most of the migrants kept close in to the side of the hill, gaining shelter from a projecting shoulder, so that their direction at different points varied between south and west, but the trend was south-west. On this day, however, some of the Chaffinches struck out west over the Oxford plain on reaching the exposed flank, though others continued along the escarpment.

In addition to the migrants, we of course saw many local individuals of the same species, and some of these birds had regular movements which might be confusing. Fortunately, the local Starlings which passed the White Horse when moving out from their roost to feed were travelling east and south-east, i.e., in the opposite direction to the migrants. Hence they could be distinguished, and the more leisured flight of the roosters was in contrast to the steady progression of the migrants. It was fascinating to see the two streams of birds passing each other in opposite directions. With a west wind, the migrants flew low and the roosters high, with an east wind the migrants were high and the roosters low. Many more individuals came out from the roost in late October than had done earlier in the month.

At the White Horse, comparatively small numbers of Chaffinches could also be seen travelling in a leisurely fashion eastwards, i.e. against the migration stream. These birds often dropped down to the hedges to feed, and we think that they had probably come from a local roosting place and were moving to some beech woods to the east to feed. We do not think that this was a case of "Rückzug." The Skylarks were much more puzzling, for while most of the migrants travelled west, others moved steadily east or south-east. On October 6th, the easterly birds, and others which flew erratically, were observed chiefly towards the end of our watch, recalling the "Rückzug," so often described from the Continent (see for instance von Haartman, Bergman and Koskimies, 1946). On October 29th, there appeared to be two definite streams, one west and the other south-east, and we wondered whether the westerly birds might be from the Continent and the others from northern Britain. Further study is desirable.

Place. The main stream tends to be quite narrow, in some places only a few hundred yards in width, but it varies with the locality, the species, and the wind. The stream is narrowest, and therefore best for the watcher, where a bare scarp rises steeply from a wooded plain, but the hills rarely end in so definite a manner, and in some places where there are subsidiary hills or valleys, the flocks are dispersed so much that little is seen at any one point. Chaffinches (and Great Tits) show a marked tendency to fly above woods or belts of trees, especially when their flight is getting less certain later in the morning. Skylarks, on the other hand, chiefly fly over open ground. As a result, at Beacon Hill, the best locality for Chaffinches was about $\frac{1}{4}$ mile distant from the best for Skylarks. Chaffinches also varied with the wind; at Beacon Hill on a still day they flew along the wooded Icknield Way at the foot of the hill, but with a strong head-wind none were travelling here, and nearly all were coasting round about half way up the side of the hill.

A simultaneous watch by the writers at Beacon Hill and by J. Gibb and R. A. Hinde at the White Horse Hill, between 07.00 and 08.40 G.M.T., on October 22nd, suggested that four times as

many Chaffinches passed the White Horse (521), as passed Beacon Hill (146) in the same time. This was to be expected, as migrants travelling mainly south-west would be deflected to a much greater extent by a westerly than by a south-westerly barrier.

Size of flock. Each species normally travelled in separate flocks, but occasionally (perhaps by chance) two species were travelling together. Skylarks moved in very small parties, usually of less than 10 individuals, though parties of 10-20 were not uncommon. The largest seen contained 25 birds. On the peak days, Chaffinches were commonest in parties of 20-30, but parties of less than 10 and of up to 60 individuals were not uncommon. Starlings usually passed in parties of 10-20, but with occasional much larger parties, up to 300 strong.

Species. Only three species were common, Chaffinch, Starling and Skylark, in that order. Skylarks were the commonest on our first day's watch on October 6th, and Starlings on our last two on October 27th and 29th, but Chaffinches easily outnumbered the rest on the other days. We may well have missed the Skylarks' peak. In addition, small numbers of several other species were seen. Greenfinches (*Chloris chloris*) were quite common, but we could not be certain whether they were migrants or local birds, and the same applied to flocks of Linnets (*Carduelis cannabina*). Similarly, most of the Yellowhammers (*Emberiza citrinella*) seen flying about were undoubtedly local birds, but a few flying steadily west were considered to have been migrants. Also taking the same route, and evidently migrating, were an occasional Meadow-Pipit (*Anthus pratensis*) (up to 7 on one day), Pied Wagtail (*Motacilla alba*), Woodlark (*Lullula arborea*), Mistle-Thrush (*Turdus viscivorus*), Song-Thrush (*T. ericetorum*) (including one party of 20), and Redwing (*T. musicus*). An odd Common Gull (*Larus canus*) and Lesser Black-backed Gull (*L. fuscus*) also took the same route.

The most surprising discovery on the peak day, October 20th, was a small movement of Great Tits (*Parus major*). One party of 6, and later another of 4 birds, was seen flying steadily west in the teeth of the wind across the open fields, like the Chaffinches being lost to sight when they entered a wood on their line of flight. The habit of this species when migrating of seeking wooded cover on the line of flight has been reported on the Continent. The birds were flying far too definitely, and too much in the open, to be regarded as local birds, and a movement of this species in small numbers has also been reported by Bannerman (1944) in North Devon.

Origin and Destination. On this it would be premature to speculate far. Presumably many of the birds taking part in the movement are of Continental origin, and one would think this must apply to the Starlings, Chaffinches and Great Tits. Ticehurst (1932) has discussed the southerly and westerly movements of

diurnal passerine migrants on the Suffolk coast, while on the other side of England first Bannerman (1944, 1945), and later Allen (1944), Hartley (1945) and Hurrell (1944) have described similar movements in North Devon and Cornwall. The obvious suggestion is that the Berkshire and Oxfordshire birds are en route between East Anglia and Devon. Bannerman (1944) supposed that the birds he saw in N.W. Devon came from Wales, but this is solely because E. W. Hendy has not reported a similar migratory movement at Porlock, further east in Somerset. As we have now found a passage much further east, this objection disappears. As to why such a movement has not been seen at Porlock, we would suggest that the critical place on this coast has not yet been found—note our earlier comment on the narrowness of the belt, and the need for watching early in the morning. As Bannerman apparently observed larger numbers of birds than we did, the Devon birds very possibly include not only those seen by us in the Midlands, but others descending the Severn Valley, and perhaps others from Wales. On a cold October day in 1947, P. H. T. Hartley and D. Lack saw a marked passage of passerine migrants flying over the Forest of Dean south-east towards the Severn Valley. Observations further north on the Chilterns would also be of interest. It will be recalled that, in the eighteenth century, Dunstable was the most famous place in Britain for autumn Skylarks (Pennant, 1776).

To conclude, here is a stimulating and spectacular problem for future research. There is nowhere in England where some diurnal migration cannot be seen, and it is up to the readers of *British Birds* to carry the problem further.

SUMMARY.

In October, a concentrated stream of diurnal passerine migrants can be seen flying west below the escarpment of the Berkshire Downs, and on a smaller scale south-west along the Chiltern escarpment. The three main species are Chaffinch, Skylark and Starling, with several others in small numbers, including the Great Tit. The passage is probably linked with those seen in Suffolk and Devonshire.

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APPENDIX.

NUMBERS OF THREE COMMONEST MIGRANTS AT WHITEHORSE HILL.

Date	Time (G.M.T.)	Weather	Wind	Chaffinch	Starling	Skylark
Oct. 6th	0700-0730, 0808-0852	Fine, rather cold.	Still. S. wind rising	45	0	133
Oct. 20th	0705-0850	Fine, mild	W., strong	1540	205	57
Oct. 22nd	0700-0900	Fine start, light rain later.	S.W., gale	587	49	250
Oct. 26th	0702-0802	Fine, clear, cold	N.W., moderate	112	41	46
Oct. 27th	0652-0822	Fine, very cold.	S.E., very light.	74	790	65
Oct. 29th	0650-0820	Fine, over- cast, cold.	E. light.	30	585	50

PEAK PASSAGE FOR EACH SPECIES.

	Chaffinch	Starling	Skylark
Oct. 6th	0700-0730		98
Oct. 20th	0700-0745	876	
Oct. 27th	0708-0752		618

NOTES.

UNUSUAL BEHAVIOUR OF CARRION CROW.

ON April 21st, 1949, at Lodge Heath, West Suffolk, we observed a Carrion Crow (*Corvus corone*) behaving in an unusual way. Three birds were seen to land on the outside branches of a moderate-sized deciduous tree. The middle bird immediately appeared to swing beneath the branch like a Siskin (*Carduelis spinus*), passing beyond the perpendicular, and then maintained a position with its body vertically downwards, the beak pointing stiffly down, and the tail slightly spread. It remained in this state for about five seconds, and then left hold of the branch and dived down upon the lower bird, which was some two feet below it. The latter left hurriedly and the two flew off. The incident then closed and both birds flew back into the tree belt separately. R. G. PETTITT AND D. V. BUTT.

COURTSHIP FEEDING OF JACKDAW.

ON April 17th, 1949, I saw courtship feeding take place between a pair of Jackdaws (*Corvus monedula*). The birds were on rough grass-land. One, presumably the female, crouched with wings partly opened and fluttering, while the other hopped to it and put something into its wide-open bill. This happened just as I first noticed the birds, so that I cannot say what behaviour preceded it; and the action was not repeated, seemingly because the birds became aware of my presence.

The Handbook does not mention the habit for this species.

A. A. WRIGHT.

[We know of no similar record, though "billing" has been recorded in this species—*antea*, Vol. xxxviii, p.53—EDS.]

STARLINGS FEEDING ON CADDIS LARVÆ

A small pond in my garden at Bounds Green, Middlesex, contained a large number of caddis-fly larvæ, and when the water had dried out these were left exposed on the mud at the bottom. Within a short time they were discovered by five Starlings (*Sturnus vulgaris*), which were watched taking them for about an hour. Their method was to knock the cases vigorously against a convenient stone until, after much difficulty, the larvæ were extracted and eaten.

Not all the contents were successfully removed, but the birds' usual method of feeding, probing in the lawn, was entirely forsaken until all the larvæ had been investigated. An equally large number of water-snails was ignored entirely.

G. FRASER FIFE.

GREENFINCH USING PREVIOUS YEAR'S NEST.

ON May 11th, 1949, I heard a pair of Greenfinches (*Chloris chloris*) engaged in a violent squabble in a lilac tree. They were so engrossed that I was able to approach within a yard and watch them for a short time until they took alarm and flew off. I hunted

for their nest, which last year had been in a bay tree next to the lilac about seven feet from the ground, and which, in point of fact, is still there. Failing to see a nest in the lilac I looked in the bay without result, until I put a finger into the old nest, in which I was surprised to find four eggs evidently (from the colour) well incubated. Later the birds returned, and the cock chased the hen back on to the nest.

G. H. R. PYE-SMITH.

CORN-BUNTING ROOSTS IN THE NORTH KENT MARSHES.

As *The Handbook* gives little information about the roosting places of the Corn-Bunting (*Emberiza calandra*) the following notes may be of some interest.

Late in the afternoon of October 24th, 1937, I saw a party of about thirty Corn-Buntings close together on telegraph wires by the side of a large reed-bed near the Isle of Grain, and at dusk watched them drop into the reeds. From that date until the autumn of 1939 and more recently from February, 1946, up to March, 1949, I have found parties of from thirty to eighty birds regularly using this reed-bed for roosting on various dates from the latter part of August to the end of March.

Shortly before dusk on January 9th, 1949, Dr. J. S. Carter and I disturbed parties of this species from a dried up reed-bed alongside the sea-wall at Conyer. I walked through the bed to get an idea of the numbers roosting and we counted one hundred and sixty which flew out from tussocks of grass amongst the reeds.

I may also add that in other districts I have seen small parties collecting in bushes on the edge of the marshes late on a winter's afternoon and have watched them fly off into the marshes shortly before dusk.

E. H. GILLHAM.

UNUSUAL DISPLAY OF FIELDFARE IN SPRING.

ON March 12th, 1949, in Wretham Park, near Thetford, I had a flock of forty-three Fieldfares (*Turdus pilaris*) under observation for about twenty-five minutes. They were scattered in a meadow, and were busily engaged in feeding. Suddenly, a bird was seen to elevate its tail to an angle of ninety degrees above its back, partially spreading it, and at the same time flicking its wings by its sides, in a manner reminiscent of a Robin (*Erithacus rubecula*). Still maintaining this display it ran forward towards another bird feeding near by, the latter quickly running away. However, the displaying bird suddenly took to a low flight, and on alighting took up the same attitude as before, but with its back turned towards the other bird, which commenced to hop towards it. It then took to flight, alighting at the other end of the meadow. A similar display was adopted by another bird, which ran towards a feeding bird in front of it, with the result that this bird took to a low flight.

I can find no reference to similar behaviour in *The Handbook*.

D. V. BUTT.

LITTLE OWL ATTACKING MOORHEN

ON March 3rd, 1947, when on frozen Willesley Lake, Leics., I saw under the trees overhanging the water two birds fighting. One was a Moorhen (*Gallinula chloropus*) and it was desperately clawing at a Little Owl (*Athene noctua*) which was attacking it. The birds separated as I approached and the Moorhen, which I discovered crouched under a tree, flew away apparently unharmed. The fact that the Little Owl attempted to overcome a bird considerably larger than itself can presumably be attributed to the influence of the severe weather.

J. R. M. TENNENT.

PROBABLE OCCURRENCE OF WHITE-FRONTED GOOSE
OF THE TYPICAL RACE IN Co. MAYO.

HAVING recently been informed that a White-fronted Goose—the bill of which was pink—had been shot near Ballycroy in 1948, I interviewed Mr. J. H. Taylor, of Rock House, Ballycroy, who had shot the bird.

As a result I obtained information from which it would appear that the bird was probably of the typical race of White-fronted Goose (*Anser a. albifrons*).

Mr. Taylor had his interest in geese further aroused by correspondence in the press regarding the forms of White-fronted Goose. He states that early in February, 1948, a party of six geese arrived in a locality near Ballycroy. These birds did not associate with the other geese in the area and if disturbed invariably kept separate, whereas other parties would join up to form one flock. On February 20th, 1948, Mr. Taylor shot one bird out of the party in question. While he admits that he had not noticed any plumage difference in the six birds so often seen, he was at once struck by the very noticeably pink bill of the bird he had shot. In course of discussion it was admitted that whereas no marked difference had been noticed in the upper-plumage of the specimen, that of the breast was much paler and far less heavily barred than in the orange-billed birds normally shot.

That the bird was a form of White-fronted Goose is beyond doubt. Mr. Taylor knows this goose well and the one shot had the white forehead and barred breast of an adult. Upon being shown the plate in *The Handbook*, Mr. Taylor unhesitatingly pointed to the illustration of the pink-billed bird. It is unfortunate that the bird was neither critically examined nor preserved.

To find this race so far west in Ireland, of its visits to which there is so little evidence, must be quite exceptional, and it seems advisable therefore to place this probable occurrence on record.

ROBERT F. RUTTLEDGE.

[It should perhaps be explained that the majority of White-fronted Geese visiting Ireland belong to the yellow-billed Greenland race, *Anser albifrons flavirostris*, the distinctness of which has been

recently established, see Dalgety and Scott, *Bull. Brit. Orn. Club*, vol. 68, pp. 109-121.—EDS.]

SHOVELER BREEDING IN MIDDLESEX.

The Handbook of British Birds mentions no definite breeding of Shoveler (*Spatula clypeata*) in Middlesex, but states "probably bred 1935." My own records suggest that the Shoveler has bred regularly in Middlesex from 1937 to 1947. Definite breeding, however, was not proved (See *London Bird Reports*, 1946 and 1947.)

Two pairs were present in a suitable breeding area near Stanwell, Middlesex, during spring, 1948, and throughout July a female was frequently flushed from thick vegetation on the edge of a flooded field, and "injury-feigning" was noted on two occasions. It was not, however, until August 12th, 1948, that breeding was actually proved. On this date I was accompanied by Messrs. P. J. Hayman, C. Hughes, and G. W. Moore, and we then saw at very close quarters a female Shoveler escorting eleven young through shallow water interspersed with thick cover; the male—as on previous occasions, was on open water in the centre of the field.

This constitutes the first definite breeding record for the county.

C. A. WHITE.

FERRUGINOUS DUCK IN WARWICKSHIRE.

ON February 13th, 1949, I observed a male Ferruginous Duck (*Aythya nyroca*) at the Earlswood Reservoirs, Warwickshire. Its general colouring was rich brown, darker on the head and back, with white under tail-coverts. When it flapped its wings, the white lower breast and belly were seen. It had a conspicuous white eye. The bill was dark blue-grey with a lighter band near the nail, and along the cutting edges. In flight it appeared not unlike the four Goldeneye (*Bucephala clangula*) with which it flew. At other times it associated with a Coot (*Fulica atra*).

It was seen later the same day by Messrs. A. Cundall, J. Sears, A. A. K. Whitehouse and other observers. It had every appearance of being a wild bird, as it was very wary and flew readily. The possibility of its being an "escape" cannot be entirely discounted, but, through the good offices of the Severn Wildfowl Trust, I am told that there are now no Ferruginous Ducks in captivity in this country. The bird has not been seen subsequently.

This would appear to be the first recorded occurrence of the species in Warwickshire.

P. EVANS.

BEHAVIOUR OF LITTLE GREBE WITH YOUNG.

ON May 8th, 1948, two nestling Little Grebes (*Podiceps ruficollis*) were seen near an empty nest, in low cover, on the western side of Fowl Mere, near Thetford. They swam about in a bewildered fashion in the low cover, maintaining an incessant cheeping, and on one occasion one bird was seen to dive. As I stood watching them on the bank, a parent bird passed to and fro in front of me,

along a stretch of about ten yards, parallel to the bank and only a few yards from the water's edge. It surfaced at regular intervals for a brief second, calling shrilly "kleep, kleep," only to dive again immediately, kicking up a large spurt of water behind it as it did so. It patrolled up and down this stretch some three or four times, but when I left the vicinity of the young, this behaviour stopped almost immediately.

I can find no mention in *The Handbook* of comparable behaviour by the adult Little Grebe when the safety of its young is threatened.

D. V. BUTT.

[Reference may be made to a previous note (*antea*, pp. 91-92) in which a "splashing dive" is mentioned as a danger signal. On that occasion, however, the splash was produced by the wings.—EDS.]

BONAPARTE'S SANDPIPERS IN NORFOLK AND SUSSEX.

EARLY in the morning of October 1st, 1948, one of us, D.D.H., saw from the East Bank, Cley, Norfolk, a small wader which seemed to him rather different from the Dunlins (*Calidris alpina*) feeding near by. It kept apart from other waders, moved somewhat rapidly, seemed rather small for a Dunlin and had a short bill and white belly. Inspection through a telescope, however, showed that it could not be a Little Stint (*Calidris minuta*), as had been at first suspected, since it was only slightly smaller than a Dunlin and had a streaked and speckled breast. Its upper-parts had much the same coloration as those of a Dunlin in winter plumage and D.D.H. finally decided that it also was of this species.

A few minutes later A.R.M-B. and L.S., who were proceeding along the base of the sea wall, came within a few yards of this same bird and, being likewise puzzled by its appearance, put it up. It flew a short distance, uttering a short, sharp call which was quite unfamiliar to both observers and which they noted at the time as sounding like "jeek." It also showed a white rump above a dark tail as it flew. They were then able to get within 20 feet of the bird and noted that it was much like a rather small Dunlin in winter plumage, with a short, almost straight black bill and black legs. The coloration of the upper-parts was greyish brown and the breast was streaked and spotted with the same colours. The belly was white and there was a whitish eye-stripe. In flight A.R.M-B. noted a paler shade on the wing, but L.S. did not notice this. Both observers noted the absence of a wing-bar.

It was realized that the bird could only be a Bonaparte's Sandpiper (*Calidris fuscicollis*) and L.S. went to fetch D.D.H. Meanwhile the bird had been chased by a Dunlin and had flown some distance away, joining other waders. On arrival D.D.H. made his way over the mud towards the flock of feeding waders. On his approach the bird flew up alone, with a low, rather twisting flight, showing its white rump and giving its call, which D.D.H. also found

quite unfamiliar and which sounded to him like a short, sharp, "zeet." It then disappeared amongst other flying waders and could not be found again, either then or later in the day.

Early in the morning of the next day, October 2nd, D.D.H. went with Mr. D. H. Brown to look for the bird in the same locality. Few waders were at first present and the bird was not found. However, a little later, on coming back to the area, it was seen that a number of waders had arrived and, on approach, the Bonaparte's Sandpiper flew up from among these, being the only bird to do so. It uttered the same short, sharp call as before, which was new to Mr. Brown also, and its white rump was seen by both observers. The flight was the same as before, low and rather twisting. The bird disappeared over the East Bank, but was found again a few minutes later feeding in a small pool with Ringed Plovers (*Charadrius hiaticula*). It now allowed a near approach and it was possible to get within 30 feet of it. Inspection through binoculars (10 × 50 and 12 × 40) showed all the features previously described as being seen when the bird was on the ground. In addition the chin and throat were seen to be white and it was noticed that the markings on the breast terminated in a rather definite line, somewhat reminiscent of the American Pectoral Sandpiper. The short, black bill seemed very slender, as also did the black legs. On this occasion the bird's movements were more deliberate than had been the case on the previous day and were very similar to those of the Dunlin. A short flight (during which the characteristic call was again given) showed once more the white rump and the dark tail. There was a vague palish shade on the wing but no wing-bar. When put up again the bird made off into the neighbouring marshes and was seen no more.

Since all of us had to leave the district later that same morning no further attempt to find the bird was possible.

This appears to be the first record of Bonaparte's Sandpiper for Norfolk.

D. D. HARBER, A. R. MEAD-BRIGGS AND
L. SALMON.

ON September 19th, 1948, we observed an unfamiliar wader at the Midrips near Camber, just inside the Sussex border, which we identified from notes taken to be a Bonaparte's Sandpiper (*Calidris fuscicollis*).

The bird first attracted our attention by its straight, slender, short bill when compared with Dunlin with which it was feeding and it also gave the impression of having slightly shorter legs. When it was flushed the white tail-coverts were clearly visible and the call note a rather thin "chinck," uttered several times was heard. This note was unlike any other wader's call with which observers were familiar, being not so hard and more musical than that of Little Stint.

Other details noted were :—Head grey-brown, greyer and more uniform in marking than Dunlin; thin, indistinct light stripe above

eye, enlarging to roughly circular patch behind eye. Back and upper wing-coverts similar to winter-plumage Dunlin, but wing-coverts with white margins, and faint patches of chestnut on shoulders were noticeable. Tail-coverts white. End of tail blackish in centre with a lighter shade of grey on outer feathers. Upper-breast well streaked with brown, but terminating on breast, leaving lower breast, belly and flanks pure white. Legs and bill dark brown or black. Bill shorter than Dunlin. The size of the body was the same as that of the smallest of the twenty or thirty Dunlins which accompanied it.

No noticeable difference was observed in its feeding habits compared with those of the Dunlin.

Good, close views for about one hour were obtained in bright light with $\times 8$ and $\times 9$ field-glasses, and $\times 25$ telescope. We may add that all three of us are familiar with Curlew-Sandpipers (*Calidris testacea*), the only other species with which the bird could possibly have been confused, and of which three individuals were present near by at the time when comparisons were being made.

F. W. AND E. A. BLAKE, AND H. A. R. CAWKELL.

[These two carefully authenticated records constitute an interesting addition to the other records of American waders in Britain in the autumn of 1948 (*antea*, pp. 135-143, 155-158).—EDS.]

NOTES ON BROAD-BILLED AND TEREK SANDPIPERS AT ADEN.

THE following observations, made at Aden in 1946-47, somewhat amplify the particulars given about these species in *The Handbook*.

Broad-billed Sandpipers (*Limicola falcinellus*) are visitors to Aden from July to March. They frequent tidal mudflats during the whole of this period, though at migration times I also found small numbers by muddy pools in a salt-condensing area near the sea.

Normally on the coast they mix when feeding with the large flocks of small waders, particularly Lesser Sand-Plovers (*Charadrius mongolus*), but also often with Curlew-Sandpipers (*Calidris testacea*), Dunlin (*C. alpina*) and sometimes with Little Stints (*C. minuta*), Terek Sandpipers (*Xenus cinereus*) and Sanderlings (*Crocethia alba*). When put to flight I found it usual for the whole party of Broad-billed Sandpipers, previously scattered, to congregate and form a separate flock. They were not shy: approach to within twenty yards was not exceptional. The largest number I saw together was c.60 (with c.70 Lesser Sand-Plovers) on February 24th.

Their appearance was distinctive. The short legs, combined with a "heavy" bill, rather decurved towards the tip, and small size was quite sufficient to separate them from Dunlin or stints even at fairly long range or if the dark colouring of summer plumage could not be made out.

The normal alarm note was a short twitter or trill. I rendered the call of one flushed on September 22nd as a series of two distinct

sounds—"tit-tit-twerrrk-tit-twerrrk-..." etc, ending with a repetition of the trilling note.

Terek Sandpipers are also mainly cold weather visitors to Aden. Their habitat is much the same as that mentioned above, but occasionally they may be seen on sandy beaches.

Largest numbers are found on mudflats in the harbour. Here parties or single birds of this species feed among the flocks of other waders, particularly Curlew-Sandpipers, Lesser Sand-Plovers and Dunlin; more irregularly with Little Stints, Broad-billed Sandpipers, Sanderlings and Redshanks (*Tringa totanus*). However, independent parties also occur at times and on March 10th, I saw a compact flock of c.85 standing on an islet. These birds were tame and allowed me within thirty yards, but on another occasion a single bird flew off at 200 yards.

Usually the Terek Sandpiper was a noisy bird when approached. Only a score or so among, say, a thousand small waders feeding on the flats would announce themselves, even before they could be picked out with glasses, by their continuous loud piping twitter. The normal call or alarm was as rendered in the *Handbook*—"twit-a-whit-whit-whit", with variations "pip-ip-ip-ip", "wik-wik-wik", and "tewi-tewi", much more mellow than with the Common Sandpiper (*Actitis hypoleucos*). Only once (January 1st) I heard a quite different trilling call—"titititree."

P. W. P. BROWNE.

FEEDING BEHAVIOUR OF BLACK-HEADED GULLS

IN a note under this heading (*antea*, p. 28) N. W. Hussey describes five Black-headed Gulls (*Larus ridibundus*) feeding by running through shallow water with bills submerged. Since I first noticed this method of feeding on April 13th, 1946, (*antea*, vol. xxxix, p. 286), I have observed it on three or four occasions on the Kent Estuary, Westmorland, and conclude that it is not very uncommon, at least in this district. For example, twelve Black-headed and two Common Gulls (*Larus canus*) were feeding in this way in a shallow pool on October 5th, 1946; and on September 19th, 1948, a single Black-headed Gull was repeatedly running into a rising tide with head and neck submerged and wavelets breaking over its back. It once emerged with a small fish. It seems possible that this kind of variation from normal feeding habits may spread by imitation, and so be more frequent in some localities than in others.

J. A. G. BARNES.

[Several correspondents have sent in notes on this subject and it is evident that the behaviour described by Messrs. N. W. Hussey and J. A. G. Barnes is commoner than was supposed. Mr. H. Lane records two birds behaving in this manner on the bank of the Blackwater at Maldon, Essex, on October 4th, 1947; Mr. John Reynolds watched an adult feeding in this way for several hours at Pagham Harbour, Sussex, on August 27th, 1948. Mr. K. G. Spencer reports somewhat similar behaviour at Grange-over-Sands, Lancs.,

on December 27th, 1947, though on that occasion the birds were swimming with heads submerged and wings outspread. A further example of this variant is recorded by Mr. C. J. Stevens at a freshwater pond on Par Beach, Cornwall, in July, 1948, when birds were seen "swimming rapidly backwards and forwards with most of their heads submerged."—EDS.]

COMMON GULL "HAWKING" INSECTS

THOUGH the habit of "hawking" swarms of flying insects is well known in the Black-headed Gull (*Larus ridibundus*), it does not appear to have been recorded in the Common Gull (*Larus canus*). It may therefore be worth putting on record that between July 24th and 31st, 1948, at Camber, Sussex, I witnessed several large-scale "hawking" flights by mixed flocks of Black-headed and Common Gulls. The flights were always over land and took place at dusk. A few Lesser Black-backed Gulls (*Larus fuscus*) passed through the swarms taking insects en route, but were not indulging in full-scale "hawking" as described by R. M. Lockley (*antea*, vol. xxx, pp. 325-6).
A. H. BETTS.

HERRING-GULL WITH YELLOW LEGS IN GLOUCESTERSHIRE.

IN view of the note by Dr. K. B. Rooke of a Herring-Gull with yellow legs in Dorset on June 8th, 1948 (*antea*, p. 29), it may be of interest to record the presence of a similar bird on the Portway Sewer at Bristol. The bird in question was seen among Herring-Gulls (*Larus argentatus*) at the edge of the sewer on February 20th, 1948. The gull was in perfect adult summer plumage in contrast to many of the surrounding Herring-Gulls. The legs were a bright yellow, probably appearing brighter on account of the sun shining on them. I compared the legs with the normal flesh-coloured legs of the surrounding Herring-Gulls and the greenish legs of the Common Gull, and there was no doubt that the colour was a distinct yellow. The grey of the mantle and wing coverts was of a shade intermediate between that of Herring-Gulls and a single Common Gull (*Larus canus*) near by. The bill was a very bright yellow with the gonys a vivid red, which appeared to diffuse into the surrounding yellow. The rest of the plumage was as other Herring-Gulls.

When first seen, the gull was approximately 20 yards away, but later it left the mud to swim to the centre of the river, where it could still be distinguished from the other Herring-Gulls by its perfect adult summer plumage. The bird was under observation for 20 minutes and x 8 binoculars were used.

The slightly darker mantle than *Larus a. argentatus* and the yellow legs suggest that the bird may have been one of the yellow-legged races, e.g., *Larus argentatus omissus*. The mantle was too pale for the bird to have been a *Larus fuscus graellsii*, which occurs fairly frequently, even in winter, on the lower reaches of the River Avon.
R. H. POULDING,

LETTERS

BIRDS AND FIGS.

To the Editors of BRITISH BIRDS.

SIRS,—The Fig (*Ficus Carica* L.), which is common in many countries bordering on the Mediterranean, has recently become established in widely scattered localities in England. Some of the trees grow on walls and cliffs in places where the seeds from which they originated are unlikely to have been introduced by any other agency than birds, and it is hoped that ornithologists may be able to help in the investigation of a problem which is puzzling botanists.

Seeds contained in imported figs germinate freely in this country under appropriate conditions and well grown trees on the site of a bombed dried-fruit warehouse in London Docks, on the site of a bombed greengrocer's shop in the City, and on rubbish heaps, doubtless arose from imported fruits. But this is unlikely to explain the widespread trees on bombed sites in the City of London and the West End which appeared after the period during the war when imports were restricted. Such an origin is also unlikely for the trees found in remote country districts and on inaccessible cliffs and embankments listed in my paper in the *Report of the Botanical Society of the British Isles* for 1946-47, pp. 330-333.

It has been stated that the dispersal of the tree elsewhere is by birds such as the Golden Oriole (*Oriolus oriolus*) and I should be very grateful for any notes from ornithologists recording instances of birds feeding on figs in this country or abroad or of suggestions of migratory birds which might drop the seeds on arrival in this country. The latter would be most likely to be birds which visit the London and Bristol areas from which records are most numerous.

7, Penistone Road,
Streatham Common, London, S.W.16.

J. E. LOUSLEY.

BIRDS OF HERTFORDSHIRE.

To the Editors of BRITISH BIRDS.

SIRS,—I am engaged on a history of the Birds of Hertfordshire, one of the very few English counties without such a work. In view of the probable change of the County boundaries I have decided to take Vice-County 20 as my area, that is the County with its present boundaries. Information of all kinds which will promote a complete account of the species is invited. Evidence of breeding and records of clutch sizes are required. Titles of local works, descriptions of museum and other collections, also ecological and palæontological evidence are among the features about which information is required. Communications should be addressed to me at the Zoological Museum, Tring, Herts.

WILLIAM E. GLEGG.

SPRING ROOSTING OF YELLOW WAGTAILS.

To the Editors of BRITISH BIRDS.

SIRS,—The communal roosting of Yellow Wagtails (*Motacilla flava flavissima*) in spring is a regular habit of these birds when they first arrive in this country. It occurs with birds on migration and, to a less extent, with those which have just arrived in their breeding areas. Messrs. Manser and Owen do not state (*antea* p. 224) the sex of the birds they observed, but in my experience, this spring roosting habit occurs only with newly-arrived cock birds.

In their winter quarters in West Africa, Yellow Wagtails are present in flocks, often of considerable size, right up to the departure of the male birds in mid-March. It seems that this communal urge persists, with decreasing intensity, until the territorial urge supplants it. The Yellow Wagtail does not, in my experience, become completely territorial until after the hen birds arrive, and for the first few days after they arrive in their territories, cock Yellow Wagtails will feed peacefully together in little flocks, and at evening go to a communal roost in reed-beds, osiers, or even beneath tussocky grass in a marshy pasture.

STUART SMITH,

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BRITISH BIRDS

NUMBER II, VOL. XLII, NOVEMBER, 1949.

SOME STATISTICAL INFORMATION ABOUT WREN SONG.

BY

R. B. CLARK, B.Sc., F.Z.S., M.B.O.U.

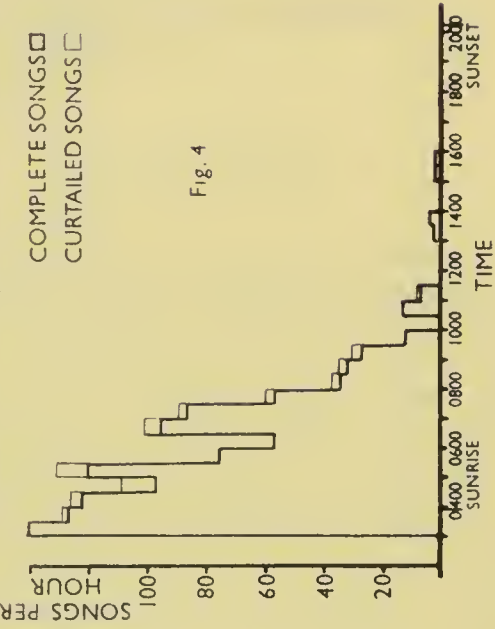
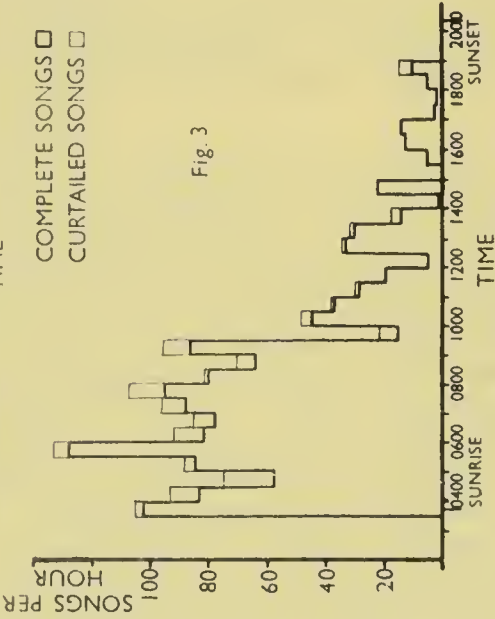
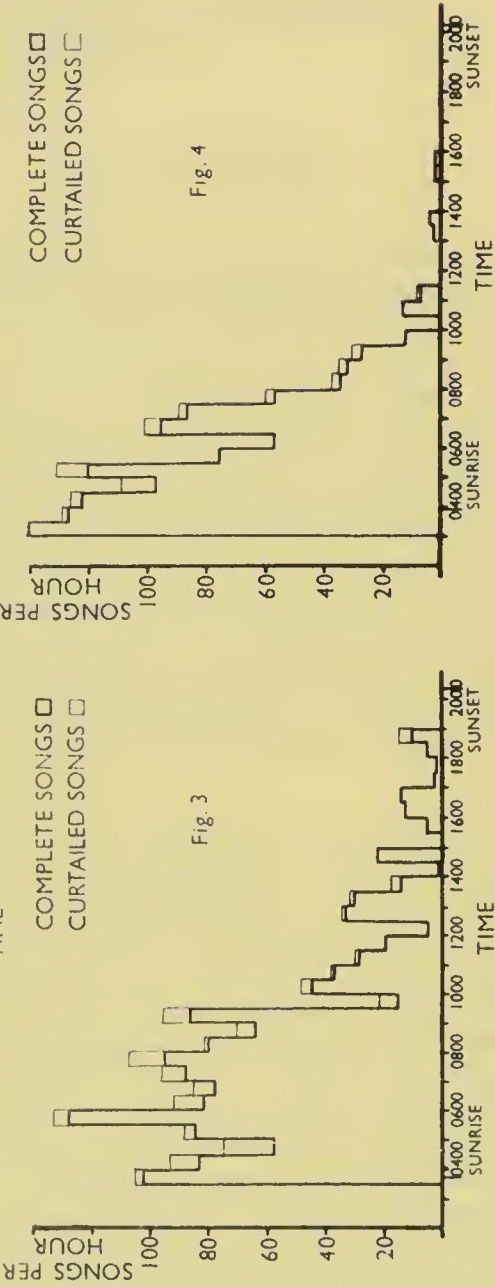
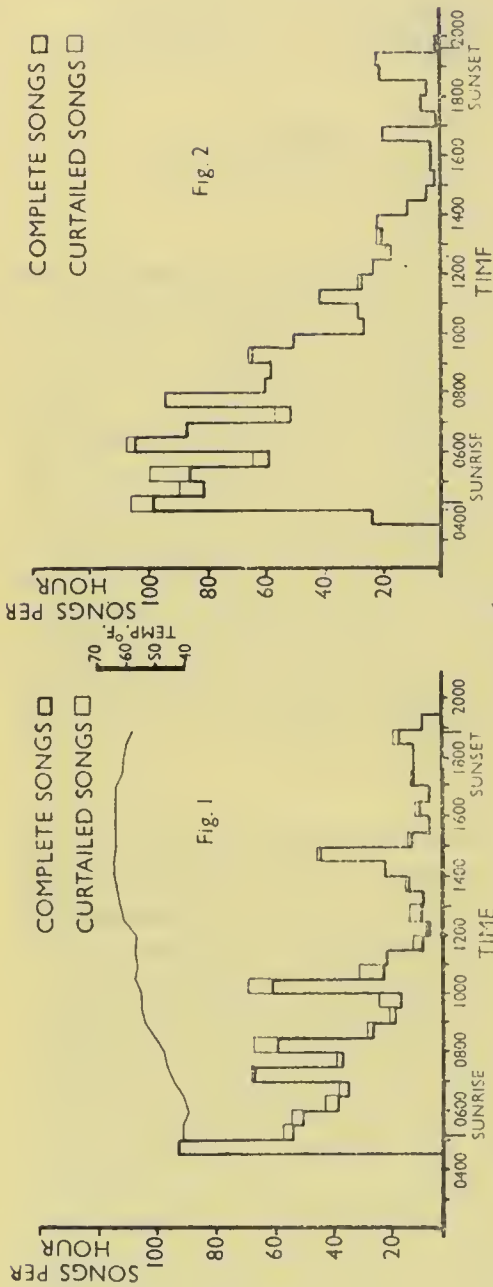
(Department of Zoology, University College, Exeter).

INTRODUCTION.

THE information used in this paper was collected incidentally to an investigation into the statistical accuracy of small samples, with the song of the Wren (*Troglodytes troglodytes*) as variate. For the purposes of the statistical work it was necessary to record the interval between successive songs over fairly long periods. So that the information might be of some biological interest the period was extended to cover the whole of the bird's day and a record was made of the time at which each song commenced. As no other data were collected the interpretation of these results from a biological viewpoint is hindered by lack of information about the activities of the birds during the day, the stage which had been reached in the breeding cycle and about the many other complicating factors which may well influence song output. To this extent therefore the present paper is offered solely as a record of data which may be of interest for comparative purposes to other workers.

METHODS.

The song of the Wren is of a stereotyped character and on the whole there is little variation in its length. The number of songs given during a certain period is an accurate way of representing song output and for most purposes it is sufficient to decide on the period (*e.g.* 30 minutes) and count the number of songs given during that time. Slightly more information was collected in this investigation because it was necessary to note the actual time at which each song began. It was found to be perfectly easy to record the time to the nearest second on most occasions, but if there had been a long interval between songs and the observer's attention had wandered, an error of something like two or three seconds was possible. This is, of course, quite negligible when the time since the previous song is 15 minutes or more. Observations were made continuously from before dawn until after dusk on April 14th, May 12th, June 23rd and July 14th, and for most of the day on August 18th, 1946. Although the bird will be spoken of as if it was the same one on each occasion it must be emphasized that there is no evidence that this was so; the same territory was under observation each time, but no attempt was made to find out if the original owner was ousted by another bird during the season. The territory included a small island and both banks for a distance of about 200 feet,



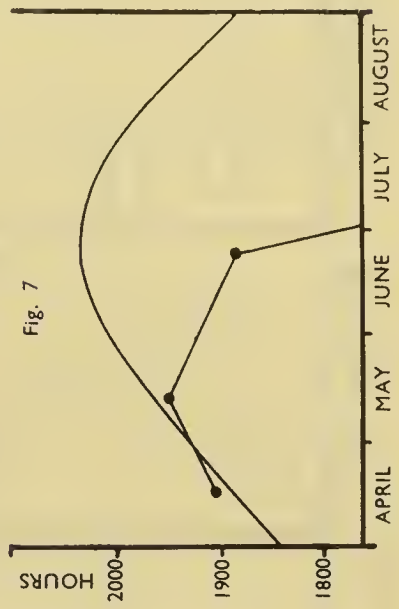
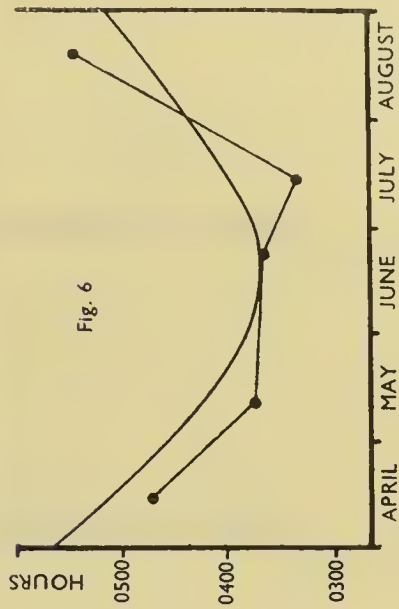
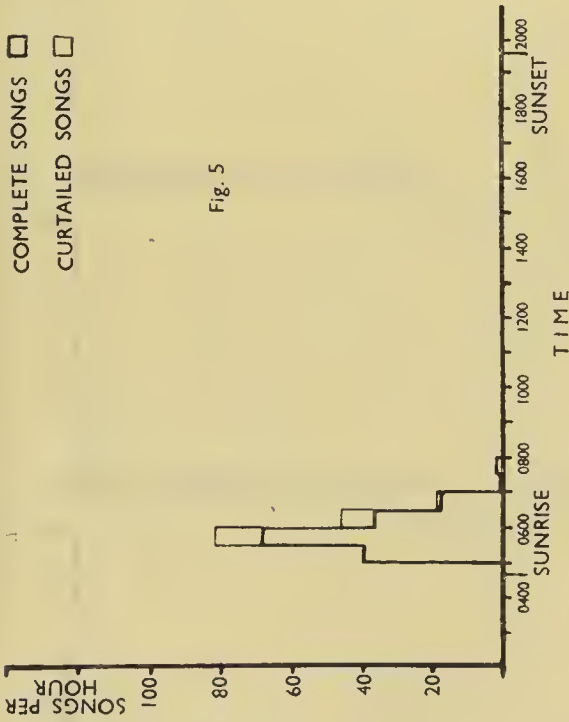
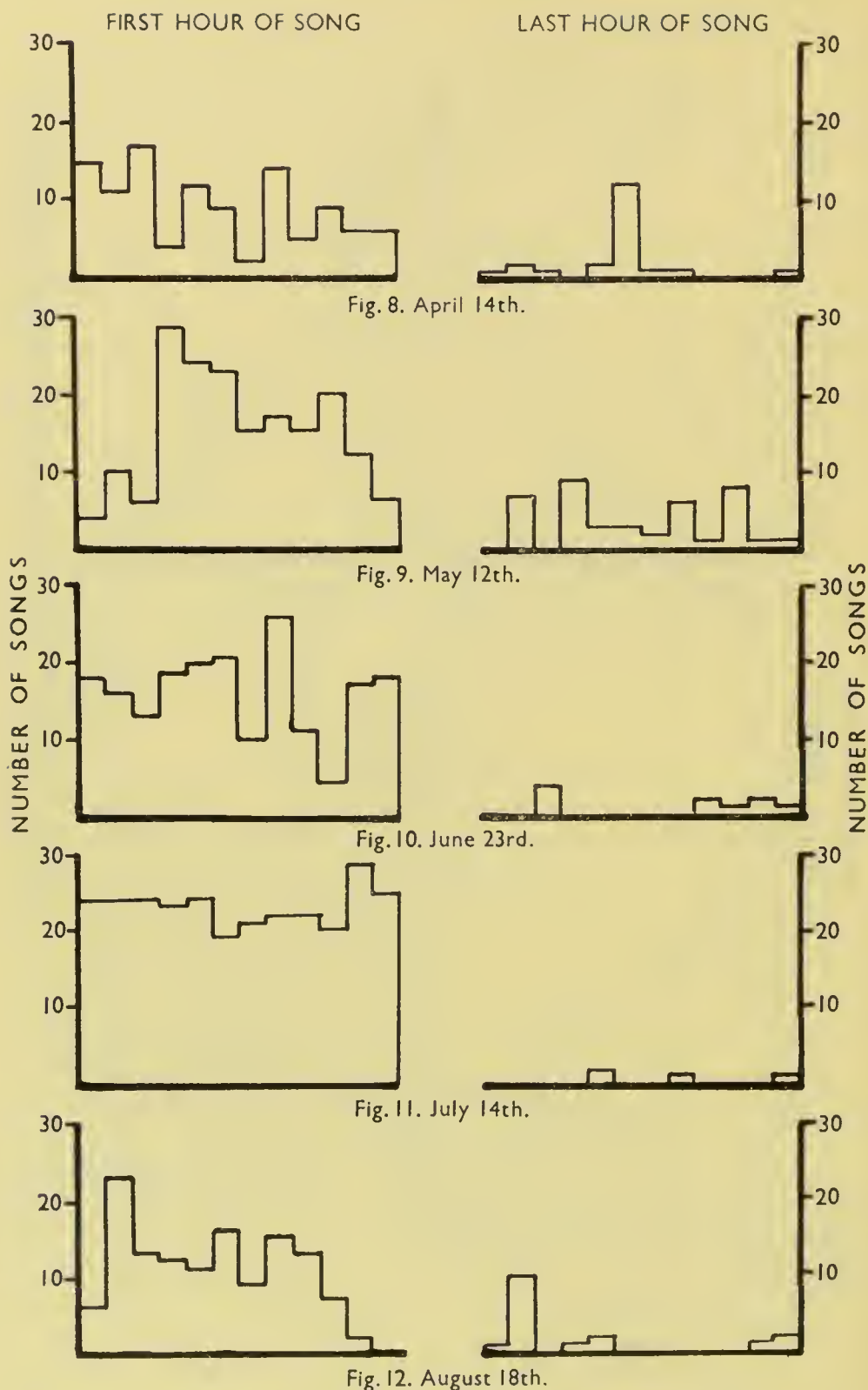


FIG. 1. SONG OUTPUT ON APRIL 14TH, 1946, AND SHADE TEMPERATURE
FIG. 2. SONG OUTPUT ON MAY 12TH, 1946.
FIG. 3. SONG OUTPUT ON JUNE 23RD, 1946.
FIG. 4. SONG OUTPUT ON JULY 14TH, 1946.
FIG. 5. SONG OUTPUT ON AUG. 18TH, 1946.
FIG. 6. TIME OF COMMENCEMENT OF SINGING AND TIME OF SUNRISE.
FIG. 7. TIME OF COMPLETION OF SINGING AND OF SUNSET.



FIGS. 8-12. NUMBER OF SONGS GIVEN DURING FIRST AND LAST HOURS OF SINGING IN 5-MINUTE TOTALS (30 SONGS CONSTITUTE RAPID AND CONTINUOUS SONG).

of the river Wraysbury, a tributary of the Colne at Harmondsworth, Middlesex. The whole territory was well wooded with willow overhanging the banks and elms, hawthorn and low scrubby undergrowth on the island. It was on the latter that the bird nested. Other Wrens held territories up- and down-stream though there was none at the sides. No attempt was made to distinguish antiphonal singing between neighbouring birds from any other sort of song as it was decided that this was quite outside the scope of the work.

DIURNAL VARIATIONS IN SONG OUTPUT.

The song output on the five days is shown in figs. 1-5. The half-hourly intervals are arbitrarily set at the hour and half-hour by the clock.* In the first and last half-hours in which the bird sang the actual output had to be multiplied by a larger factor to obtain the hourly rate than at other times, as the bird was active for only part of these periods. It was deemed to be inactive immediately before the first and after the last song of the day. In practice observations were carried on for about an hour after the last song in order to determine whether the bird had retired for the night or not. On August 18th the bird was under observation from 4.00 a.m. to 12 noon and from 4.00 to 8.30 p.m. The times at which activity began and ended can be found in figs. 6 and 7. While I have no information about its movements, Armstrong's (1) statement that the bird begins to sing continuously shortly after flying out of the roost is not inconsistent with the picture shown in figs. 8-12; song when it is once begun is maintained at a high rate for some time. A peak in song output immediately before retiring is much less definite. There is an indication of such a peak in April, May and June (figs. 1, 2 and 3), but from figs. 8-12 it is evident that it can in no way be compared with the song output during the first hour of activity. The bird under observation may not have been typical, as usually some other Wrens in the district could be heard singing well during the evening when this particular bird had stopped.

The relative rate at which song is given is nearly constant for the first five or six hours of the waking day, after which there is a marked slackening off. In fig. 13 it can be seen that the curves for April, May and June are nearly identical, but increasing discrepancies appear in July and August, when there is a tendency for the bulk of the day's song to be given early in the morning.

SEASONAL VARIATIONS.

Data of the kind given here are of little value in assessing seasonal fluctuations in song. As Clark (3) has shown for the Sky-Lark (*Alauda arvensis*) and Colquhoun (4) for Blackbirds (*Turdus merula*) and Song-Thrushes (*Turdus ericetorum*) the song output is closely related to the breeding activities of the male. The same probably applies to the Wren, but matters are very much complicated

*Greenwich Mean Time is used throughout this paper.

by polygamy and multiple nest-building. In fig. 14 the total song output on the five days is compared. The figure for April seems remarkably low, and since there were no obvious meteorological factors which would depress song (*vide infra*) one can only assume that the birds had reached some stage in the breeding cycle which is accompanied by a reduction in song output. Although there is some variation in output the general pattern is more constant: April has a more pronounced afternoon peak than the other months, May and June present almost the same pattern, while in July and August there is a further reduction in afternoon song. As far as the meagre data permit generalization, one may say that song begins

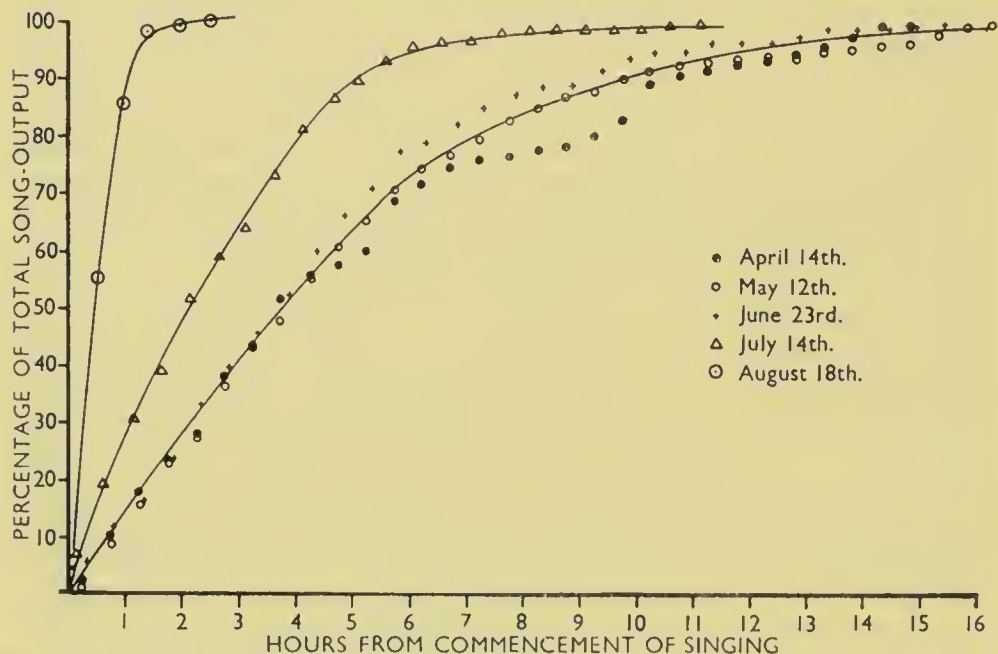


FIG. 13. CUMULATIVE PERCENTAGE OF SONG GIVEN DURING DAY.

30 to 40 minutes before sunrise (fig. 6). On June 23rd the bird began to sing only a few minutes before dawn, but apart from this the rule is fairly well adhered to. On May 31st I observed that Wrens began singing in the Scilly Isles at 3.40 a.m., that is, 35 minutes before sunrise, local time.

WEATHER.

On the five days on which observations were made the weather conditions were generally comparable; all were fine and fairly sunny. On April 14th temperature and relative humidity were measured at regular intervals (fig. 1). As the whole territory was sheltered from wind and sun by the growth of trees and bushes along the river banks, the temperature remained a good deal lower than in the adjoining fields. Unfortunately the wet-bulb thermometer was later found to be unreliable and the relative humidity measurements have been discarded. In April and May the days were fine and

almost cloudless ; in July the day was warm at first, but the wind arose and from noon until 5.00 p.m. there was a sharp drop in temperature. The weather observations made at Kew on these days and published in the daily weather bulletins of the Meteorological Office are given in Table 1 for comparison. Harmondsworth is some 10 miles from Kew, but should not experience very different weather conditions. Palmgren (5) gives grounds for believing that the song output may be directly related to the relative humidity. However, in the Wren which has been studied here, the effects produced by meteorological factors may be much reduced because it lives in a comparatively stable climate. Comparison of the song output of this bird with that of birds living in more exposed habitats may show interesting differences.

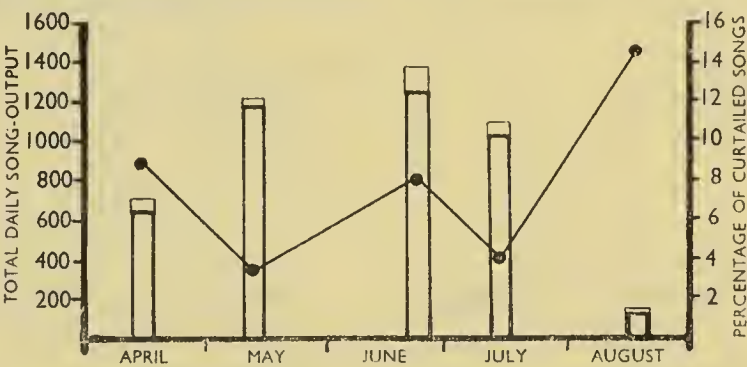


FIG. 14. TOTAL DAILY SONG AND PERCENTAGE OF CUR-TAILED SONGS.

TABLE I

Meteorological data (taken from the Meteorological Office Daily Bulletins and refering to conditions at Kew).

1946	Temperature °F.			Rain mm. in 24 hrs.	Relative Humidity		Sunshine Hrs.
	Night Min.	Day Max.	Min. on Grass		09.00 hr.	15.00 hr.	
April 14th ...	45	65	39	0	62	—	8.9
May 12th ...	45	64	43	0	89	67	7.7
June 23rd ...	56	75	54	0	78	60	9.6
July 14th ...	59	66	55	0.7	92	72	5.1
August 18th	55	—	50	0	76	71	2.3

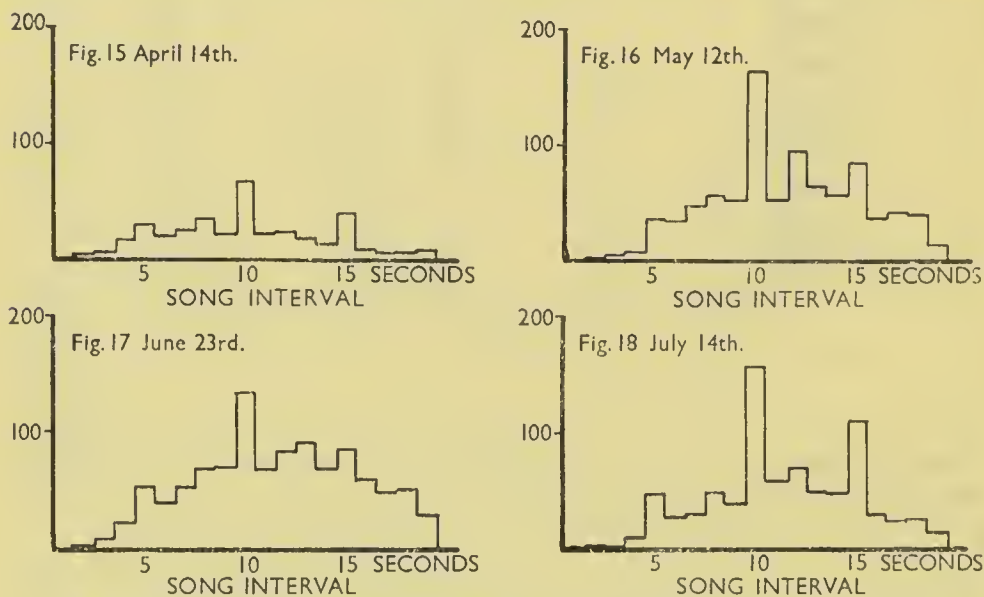
SONG DURATION.

The length of song was not required for the present investigation, but a number were timed and the usual length is 5 or 6 seconds ; though there is some variation about this figure, it is in agreement with that given by Armstrong (1). Exceptionally long songs are produced by running two or three normal songs together with, or more often without, the terminal trill to each phrase. Six songs of 41, 30, 28, 24, 18 and 16 seconds respectively are the only ones lasting

for more than 15 seconds out of a total of nearly 4,500 songs. Curtailed songs form about 7% of the total; the occurrence of them is indicated in figs. 1 to 5 and fig. 14. There is no special relationship between their relative frequency and the time of day or year, but there is a tendency for curtailed songs to be followed more rapidly than usual by the succeeding song; this is discussed in the next section. Armstrong (2) has noted that curtailed songs often occur when the male is engaged in a vigorous song duel with another male or they may be due to the presence of the female; a reduced song-interval is quite consistent with such heightened emotional states.

SONG-INTERVAL.

The song-interval may be defined as the time between the commencement of successive songs. It is not to be confused with the term "interval between songs" as Armstrong uses it, which means



FIGS. 15-18. FREQUENCY DISTRIBUTION OF SONG-INTERVALS.

the time from the end of one song to the beginning of the next. It has the advantage of being the reciprocal of the song-frequency. Figs. 15 to 18 show the frequency distribution of song-intervals for the months April to July (the song output for August is too small for statistical treatment); fig. 19 is the combined frequency distribution for the whole period. In all diagrams there is a well marked mode at 10 seconds; in most cases the mean is slightly higher. There is also a marked peak in the figures at 15 seconds, which is rather hard to interpret. Usually a bimodal frequency distribution diagram indicates an heterogeneous variate, and in this case one could only assume that there must be a special sort of song (*i.e.* possibly caused by some abnormal stimulus) which formed an appreciable proportion of all songs and which was correlated with a slightly longer song-interval. This may be so, but in the absence of further biological

data is hardly a justifiable conclusion. I am of the opinion that the peak is fortuitous. It will be observed that in every one of the figures 15 to 19 there is a tendency for the frequency of occurrence of 9 and 11 second intervals to be less than those of 8 and 12, and of 14 and 16 second intervals than those of 13 and 17 seconds respectively, though since the former are nearer the modal values (10 and 15) in each case, one would expect the converse. I suspect that the eye records everything between 9 and 11 seconds as 10 and between 14 and 16 as 15 seconds as these values are more heavily marked on the watch dial. A similar effect, though less marked, can be detected at 5 seconds. Although this argument probably disposes

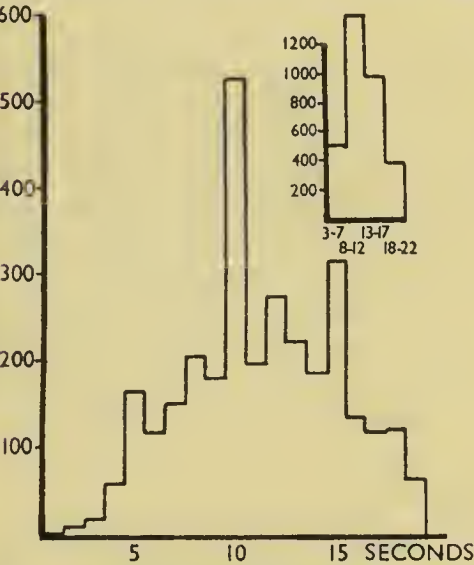


FIG. 19. FREQUENCY DISTRIBUTION OF SONG-INTERVALS : TOTALS FOR FOUR DAYS, APRIL - JULY. INSET : THE SAME IN 5-SECOND GROUPS.

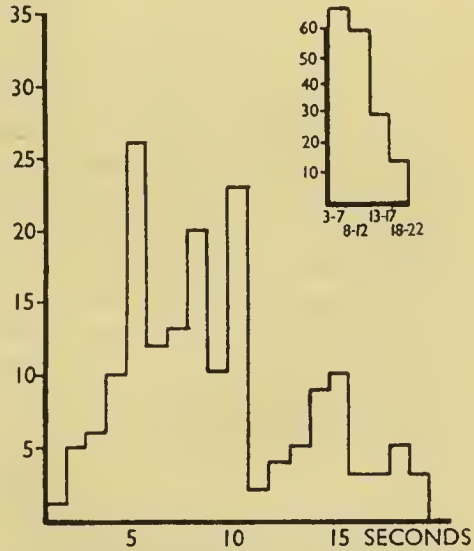


FIG. 20. FREQUENCY DISTRIBUTION OF SONG-INTERVALS OF CURTAILED SONGS : TOTALS FOR FOUR DAYS, APRIL-JULY. INSET : THE SAME IN 5-SECOND GROUPS.

of the 5- and 15-second peaks it does not invalidate that at 10 seconds. Besides having the greatest frequency it is obvious that the curves build up on either side to this value. Armstrong (1) gives the song-interval as 10 or 11 seconds.

There is a tendency for curtailed songs to be followed more rapidly by the succeeding songs than is normally the case. Fig. 20 shows the frequency-distribution of the song intervals of curtailed songs (*i.e.* from the beginning of the curtailed song to the beginning of the succeeding song). That there is considerable variation in the extent of the shortening of the interval is at once obvious from the figure. As has already been explained the peaks at 5, 10 and 15 seconds should be discounted to some extent, though here they are probably too pronounced to be excluded altogether. More convincing evidence that the interval is shortened is given in the insets of figs. 19 and 20, where the same data have been arranged in five-second groups

about the values 5, 10, 15 and 20 seconds; clearly the mode has moved from 8-13 to 3-7 seconds. It may well be that the pause between the end of one song and the beginning of the next remains constant and that the whole reduction of the song-interval is due to the curtailing of the song itself.

ACKNOWLEDGMENTS.

I have to thank the Rev. E. A. Armstrong for a very useful discussion of my results and for sending me some of his unpublished notes. Both he and Prof. L. A. Harvey have been good enough to read this paper in draft form.

SUMMARY.

The time at which each song of a Wren was given throughout the course of the day was recorded on April 14th, May 12th, June 23rd, July 14th and August 18th, 1946. The birds begin to sing 30-40 minutes before sunrise as a rule and maintain song-output at a high level for some 5 or 6 hours, after which song is reduced for the rest of the day. In April there was a well marked afternoon song period, but it was less marked in May and June and had vanished in July and August. Songs last for about 5 seconds; longer ones are produced by running three or four normal phrases together. Shorter songs form about 7% of all songs given. While the normal song interval is 10 seconds, curtailed songs are followed more rapidly by the succeeding songs.

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THE OPENING OF MILK BOTTLES BY BIRDS.*

BY

JAMES FISHER AND R. A. HINDE.

IN 1921 birds described as tits were observed to prise open the wax-board tops of milk bottles on the doorsteps in Swaythling, near Stoneham, Southampton, and drink the milk. This is the first known record of an act which has now become a widespread habit in many parts of England and some parts of Wales, Scotland, and Ireland, and which has to date been practised by at least eleven species of birds.

The spread of the habit is interesting, because of the problems of behaviour involved. How far did the individual birds learn the habit from each other, or invent it for themselves? If most of them learnt it, by what process did they do so? How did, and how do, they detect the presence of food inside the bottle?

Proper answers to these questions can be obtained only from carefully controlled experiments on birds of known history—but the Research Committee of the British Trust for Ornithology supported the writers in their view that useful information could be derived from the collection of facts about the spread of the habit from members of ornithological societies and from the general public.

Questionnaires were distributed therefore to members of the British Trust for Ornithology. These were filled in by 126 members, giving 141 records of bottle-opening by species of tits. (Records of other birds are noted at the end of this paper.) Eighteen replies were received from members of local Natural History Societies, and 43 as a result of appeals in the *British Medical Journal* and the *Lancet*. Thus about 200 records were obtained from ornithologists (mostly amateur) or from people with a scientific training. Over 200 further useful replies were obtained as the result of paragraphs in the daily or Sunday press or by personal interrogation: these confirmed the results of the preliminary enquiry.

In 223 cases the observer was able to state the year in which he first noted the habit, and to state also that he would have been in a position to note the habit in the previous year had it been occurring at his house. The remaining observers provided evidence of when and where the habit was known, but could not state the first year in which it occurred in their district.

The records of all species of tits together are shown on the accompanying maps. The 1/1¼M. National Atlas Outline Map was used for the original plot, each of the squares formed by the 5 km. national grid lines, in which the habit was known to occur, being occluded by a circular spot, of area about 15 sq. miles. The spread of the habit so far as known up to 1930, 1935, 1939, 1941, 1943, 1945 and 1947 is shown in this way on the maps.

* A publication of the British Trust for Ornithology



DISTRIBUTION OF RECORDS OF OPENING MILK BOTTLES BY TITS UP TO AND INCLUDING THE YEARS INDICATED.



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DISTRIBUTION OF RECORDS OF OPENING MILK BOTTLES BY TITS UP TO AND INCLUDING THE YEARS INDICATED.

The occurrence of the habit is naturally limited primarily by whether or not milk is distributed in bottles in the district. Thus the fact that the habit is unknown in most of the country districts of Ireland is undoubtedly due to the fact that bottles are not yet widely used there. There is, however, good evidence in many cases that the habit may not develop in a district for several years after the use of bottles has become almost universal there—this is known to have been the case in at least 23 out of 30 districts for which the year in which milk bottles were introduced is more or less accurately known. (See addendum).

Most British tits, and certainly the three species known to open milk bottles—the Great Tit (*Parus major*), the Blue Tit (*P. cæruleus*) and the Coal-Tit (*P. ater*)—are resident, and do not normally move, even in winter, more than a few miles from their breeding place. A movement of as much as fifteen miles is exceptional. It is probable that most of the birds which do move more than a few miles are in their first year. It would seem, therefore, that new centres and records more than fifteen miles distant from any place where the habit has been recorded previously probably represent new “discoveries” of the habit by individual birds.

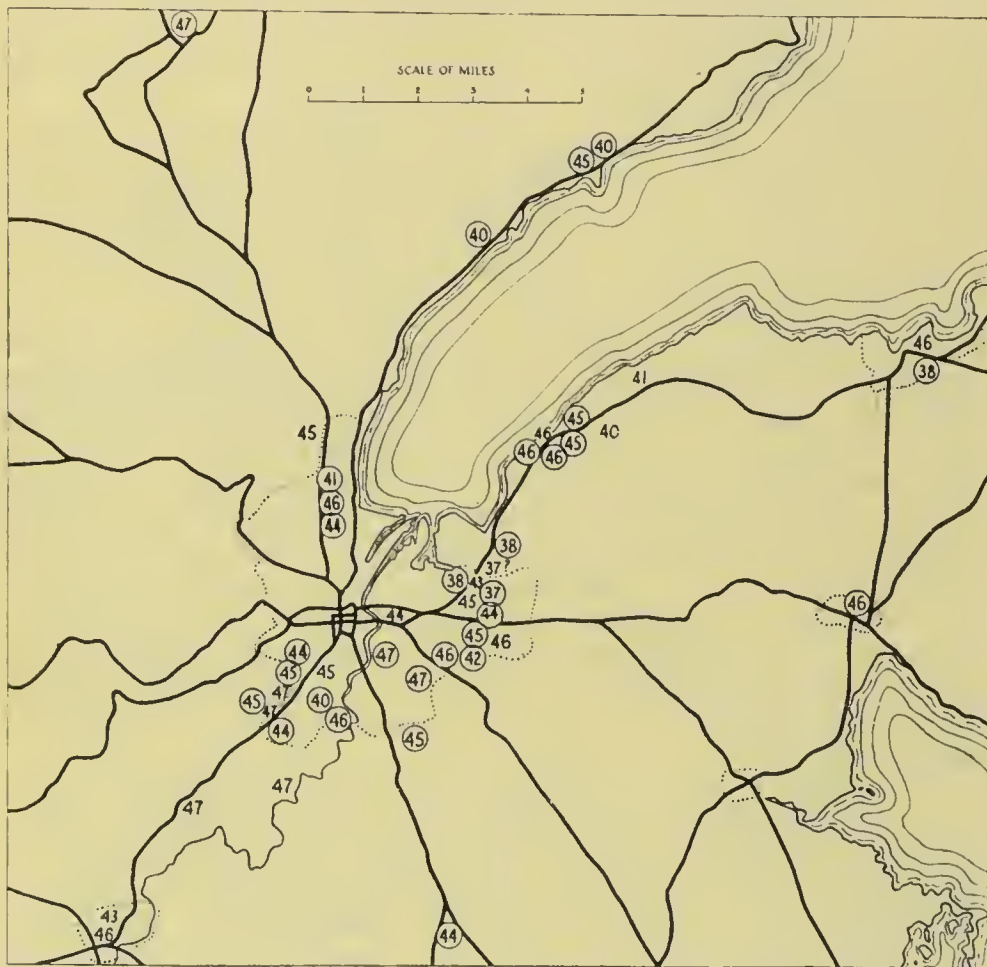
The distribution of the records is consistent with the view that this source of food was actually discovered *de novo* by only a small proportion of the tit population, and was then passed on in some way to other individuals. Thus before 1930 there were ten records of the habit, in nine separate vice-counties, but at the present time there are very few isolated records. The majority of observations made after 1930 are either from near the pre-1930 localities, or else from independent areas in which the habit has subsequently become widespread.

By 1947 there were 89 records from places more than fifteen miles from any other place where the habit had been recorded previously. Seventy-four of these records were from England and Wales, twelve from Scotland and three from Ireland. In England and Wales, then, it seems likely that the habit has arisen *de novo* on an average at least once per vice-county, and may have arisen more often than this.

The spread of the habit from a number of centres is illustrated particularly well in East Anglia. The first record was at Lowestoft, Suffolk, in 1941; this was followed in 1942 by a further record from the same place. In 1943 there was another report from Lowestoft and three from Norwich. In 1945 there was a record from King's Lynn, and in 1946 a further Norwich record and four county records. In 1947 there were eight scattered county records and the habit was apparently widespread in most districts. In 1943 there was a record from near Ipswich, and by 1947 there were ten more records from within fifteen miles of the same place.

Reports from Ireland indicate a similar spread. Forty-seven records were obtained from Belfast and district: two for 1937, three

for 1938 and forty-two for subsequent years. The two records for 1937 and two of the three 1938 records were all from points lying within an area of less than one third of a square mile in the north-eastern suburbs of the city. There are indications of a fairly orderly spread from this area to other suburbs and neighbouring urban areas, as can be seen from the map.

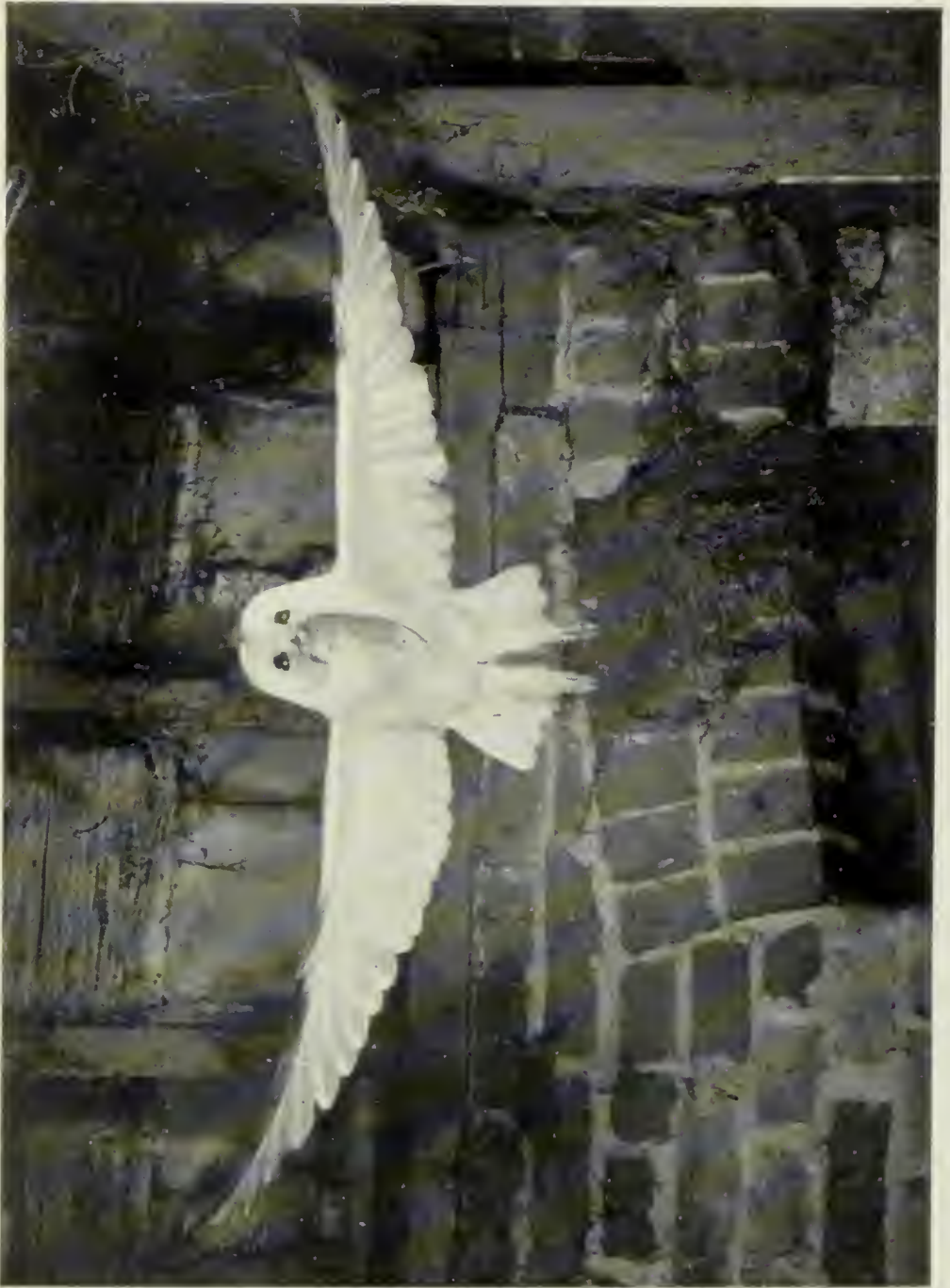


MAP OF BELFAST AND DISTRICT SHOWING YEARS IN WHICH OPENING OF MILK BOTTLES BY TITS WAS FIRST RECORDED. FIGURES IN CIRCLES INDICATE THAT THE OBSERVER WAS PRESENT IN THE DISTRICT IN THE PREVIOUS YEAR AND SO COULD HAVE OBSERVED THE HABIT IF IT HAD OCCURRED THEN. THE DOTTED LINE INDICATES APPROXIMATE BOUNDARY OF THE BUILT-UP AREA.

Similarly the whole of the spread in the London area, extending into parts of Essex and Herts, all Middlesex, and part of Bucks, Berks, Surrey, Sussex and Kent, can be derived, without anywhere jumping a gap of more than ten miles, from three points only—Dartford, Kent (1924), Chalfont St. Giles, Bucks (1925), and Richmond, Surrey (1929). We do not suggest that these were the only centres from which the habit spread—that seems unlikely—but the orderly way in which the spread of the habit can be traced from them,



HIGH-SPEED PHOTOGRAPH.
SPOTTED FLYCATCHER WITH HOVER-FLY (*Syrphididae ribesii*).
(Photographed by Eric Hosking).



HIGH-SPEED PHOTOGRAPH OF BARN-OWL WITH LONG-TAILED FIELD-MOUSE (*Apodemus sylvaticus*).
(Photographed by Eric Hosking).



HIGH-SPEED PHOTOGRAPH OF BARN-OWL WITH YOUNG WATER-VOLE (*Arvicola amphibius*)
(*Photographed by Eric Hosking*).



HIGH-SPEED PHOTOGRAPH OF BARN-OWL WITH COMMON-SHREW (*Sorex araneus*).
(Photographed by Eric Hosking).



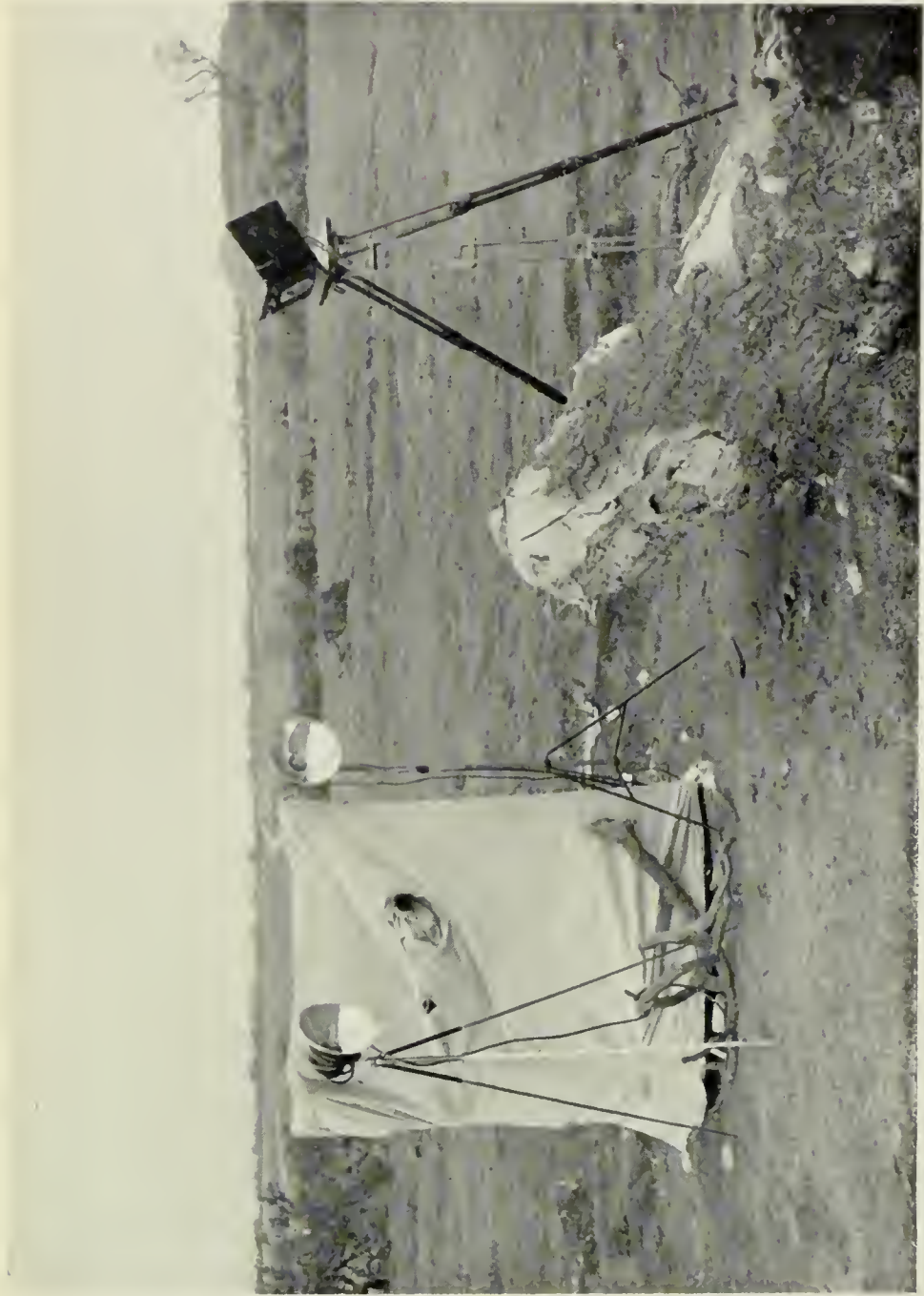
HIGH-SPEED PHOTOGRAPH OF BARN-OWL WITH SHORT-TAILED FIELD-VOLE (*Microtus agrestis*).
(Photographed by Eric Hosking).



HIGH-SPEED PHOTOGRAPH OF BARN-OWL WITH SHORT-TAILED FIELD-VOLE (*Microtus agrestis*).
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HIGH-SPEED PHOTOGRAPH OF BARN-OWL WITH SHORT-TAILED FIELD-VOLE (*Microtus agrestis*).
(Photographed by Eric Hosking).



APPARATUS FOR PHOTOGRAPHING BIRDS BY HIGH-SPEED ELECTRONIC FLASH IN POSITION IN FRONT OF A WHEATEAR'S NEST IN A HOLE IN A STUMP OF A FALLEN TREE. THE PHOTO-CELL TRIGGER UNIT IS ON THE RIGHT OF THE TREE (see the article 'Bird Photography by high-speed electronic flash,' pp. 240-241).
(*Photographed by Eric Hosking*).



STUDIES ILLUSTRATING THE OPENING OF MILK-BOTTLES BY BLUE AND GREAT TITS.
(*Photographed by V. L. Breeze*).



STUDIES ILLUSTRATING THE OPENING OF MILK-BOTTLES
BY BLUE AND GREAT TITS.

(*Photographed by V. L. Breeze.*)

through the suburbs and garden-suburbs, branching down main roads, and filtering through the housing estates, wherever there are houses with small gardens, is extremely suggestive.

It might be argued that the pattern of distribution of the observations reflects, simply, the distribution of observers. In densely populated areas there are, of course, more observers, but there are also more milk bottles. Further, there are many densely populated areas from which no record of the habit has yet been received, or from which negative records have been received. Moreover the time interval between the introduction of milk bottles and the first occurrence of the habit, referred to above, more than justifies us in rejecting this argument.

The records show that the areas in which the habit was known remained comparatively restricted until the early war years, and then increased more rapidly with each succeeding year. It would, of course, be expected in an enquiry of this nature that more records would be obtained for recent years than for earlier ones. On the other hand, the area in which the habit occurred, as well as the actual number of records, increased more rapidly each year; this does seem to support the view that, when the habit has been acquired by one tit, it can then be spread through the population by some form of imitation or learning.

The records show that even when the habit is known to be widespread in a given area it may still be unknown in some households. This is the case in parts of Belfast, for instance. This may be due to such factors as differences in the method of delivering milk or variation in learning ability among the different members of the tit population; or it is possible that the spread may be limited in some way by the structure of the tit populations. However, in spite of this it is true to say that once the habit has been recorded by one observer in a given district it usually becomes nearly universal there within a few years. In Coventry, for example, a few isolated cases were noted for the first time in 1940, and within a few years the habit had become very common in the area. In part of Llanelly the habit was first noted in 1939 at one house only amongst a group of about three hundred near a wooded area. By 1946, and possibly earlier, all these houses had had milk taken. Even when the habit is universal in one area, it may be unknown in neighbouring districts and several records have been received showing that it may be very common in one village and unknown in another only a few miles away. For example, a milk roundsman reported that in 1946 bottle opening had been common for some years in Little Aston, near Birmingham, but was unknown in Streetly and Sutton Coldfield near by.

Thus, although the nature of the investigation makes it impossible to supply any proof, it can be said that the records entirely support the view that the practice has been begun by comparatively few individual birds and that the vast majority of tits have learned it in some way from others.

Although the habit occurs throughout the year, a large proportion of observers record that it is more prevalent during the winter months than in the summer. This may be due to the increased need which the birds have for fats during severe weather, but many observers record that tits are much commoner in winter in urban or semi-urban areas than they are in summer, and this is undoubtedly also a factor of importance.

The bottles are usually attacked within a few minutes of being left at the door. There are even several reports of parties of tits following the milkman's cart down the street and removing the tops from bottles in the cart whilst the milkman is delivering milk to the houses.

The method of opening employed varies greatly. When the milk bottle is closed by a cap of metal foil the bird usually first punctures the cap by hammering with its beak and then tears off the metal in thin strips. Sometimes the whole cap is removed, sometimes only a small hole is made in it. Cardboard caps may be treated in a variety of ways. The whole top may be removed, or only the press-in centre, or the cardboard may be torn off layer by layer until it is thin enough for a small hole to be made in it; the milk may be taken through this hole or the bird may insert its beak in the hole and flick off the remainder of the top. The records show that several different methods may be used in any one district, and that more than one method may be employed by one individual. For example, Margaret Campbell watched a Great Tit tap out half the small central disc and take a few sips of milk. The bird was then disturbed, but returned in a minute or two. This time it alighted on another bottle "on which the stopper was slightly crooked; it made no attempt to peck but inserted its beak under the raised part and flicked it off in one movement . . ." It is therefore quite certain that the process which has been learnt is the whole business of obtaining milk from milk bottles, and not any particular technique for opening bottles.

If the cap is removed whole it is often carried away and held in the claw while the semi-solid cream is pecked away from the under surface. Many observers have found quite large piles of cardboard stoppers under neighbouring trees or behind hedges. Two observers placed their milk bottle tops outside daily and found that the tits still pecked at them. When the birds drink from the bottle direct, up to $1\frac{1}{2}$ in. or 2 in. of milk may be taken. Several cases are known of Blue Tits being found drowned head first in the bottle, presumably because they tried to drink too deep and lost their balance.

In areas where the opening of milk bottles is common, it is often a considerable nuisance to the inhabitants, and milkmen are instructed to invert tins or jars over the tops of the bottles. This procedure is almost invariably effective, but in some cases, where tin lids were used, less success was achieved. Thus, one observer records that a paint tin lid 6-7 in. in diameter was removed by the tit perching on

its edge. Another observer saw a Blue Tit remove a flat stone from the top of a bottle three times in succession. At another house a Blue Tit managed to reach the milk in spite of a tea cloth which had been spread over the bottles. Of course, these are not necessarily instances of insight learning, but they do represent persistent attempts to reach the milk when the top of the bottle was no longer visible to the bird.

In many areas bottles containing milk of different grades are distinguished by having caps of different colours. Although no reference was made to the subject in the questionnaires, no less than fourteen observers, who had milk of more than one type delivered at their house, reported that the tits attacked only bottles with one particular type of stopper, and four others record an almost invariable preference for one type. There seems to be no rule as to which colour is preferred—in some districts gold, in others silver, red, blue, green or brown. In these cases it would thus appear that the differentiation on the part of the tits between bottles with different coloured stoppers is due to a habit formed perhaps on the first occasions when bottles were attacked.

Without performing proper experiments, it is impossible to decide which senses are of use to the birds in indicating the presence of food. Several of our correspondents have found that bottles filled with water, and even empty bottles, are still attacked, but this tells us nothing if the previous history of the birds is not known. Walter (1943), in an extensive series of experiments on a number of species, was unable to demonstrate a sense of smell in birds, and doubts the value of the work of earlier authors who claim to have done so. Dr. Lack has suggested to us that white objects may have a particular significance—white objects seem to be most effective as bait when trapping tits.

We received over 450 separate records of tits opening milk bottles in all, regarding openings at the same place by different kinds of tits (when known) as separate. The observers have not always identified the species of tit concerned, though they were often able to identify the openers as "tits" as opposed to other kinds of birds.

Exactly 400 identifications of the kind or kinds of tit concerned in opening bottles at a definite place were made, on which we have felt we could rely. Of these, 246 were of Blue Tits, 142 of Great Tits, 11 of Coal-Tits and one of a Marsh-Tit (*Parus palustris*). Of the Coal-Tit records, seven came from south-eastern England, one from Somerset, one from South Wales and two from the Central Highlands. The single Marsh-Tit record was from St. Leonard's, Sussex, in 1942, at a place where Great, Blue and Coal-Tits had been opening milk bottles since 1941. There is no record of the Willow-Tit (*Parus atricapillus*) opening milk bottles.

The habit is, however, by no means confined to the Paridae. Several other species have been seen drinking from bottles, but, whereas in some cases it is known that these species actually open

the bottles for themselves, in others it is possible that they are merely drinking at bottles already opened by tits. The number of places from which records of these other birds opening bottles have been obtained are given below (species for which only one record has been received not included). Since some of the records are from non-ornithological observers, it is possible that some of the Hedge-Sparrow records refer to House-Sparrows.

				Seen to open bottles	Seen drinking from bottles which they did not necessarily open themselves
House-Sparrow	...	...	...	19	23
Blackbird	...	...	...	12	11
Starling	...	...	...	13	8
Robin	...	...	...	8	9
Chaffinch	...	...	...	3	9
Song-Thrush	...	...	...	4	2
Hedge-Sparrow	...	...	...	1	2

To what extent it would be correct to refer to the behaviour of those individuals which "invented" the habit for themselves as "insight learning" is a problem which it is justifiable to discuss only briefly on the present evidence. Thorpe (1943 and 1944) has discussed the ability of certain species to pull up food suspended by a thread; he takes the view that this behaviour probably represents some sort of insight learning and is not dependent on a fully formed inborn automatism. The opening of milk bottles can be divided into two parts:—(1) The recognition by the bird of the milk bottle as a potential supply of food; and (2) The technique of opening the bottle. As far as the second of these is concerned, we have seen that each individual may vary his technique from bottle to bottle, and, although the techniques may in some cases bear a superficial resemblance to those used by tits opening nuts, so that instinctive acts (in the sense used by Lorenz, 1937) *may* form a part of them, it is clear that the primary learning process is concerned with the recognition of the bottle as a food supply. Now it is possible that those birds which first drank from milk bottles without having previously seen others do so, drank from bottles which had already been opened, or from bottles in which the top was awry. One or two occasions of this type may have been enough to produce an association between the milk bottle and food. In this case the learning process would appear to resemble an advanced type of trial and error learning rather than insight learning. All that can be said, therefore, is that our present data are insufficient to *prove* the use of insight learning. On the other hand, if it is assumed that the first occurrences of the habit were not dependent on some accident such as a misplaced bottle top, then it would seem that in each district the milk bottles presented equal sensory clues to all birds which came near them, that only certain rather exceptional birds were able to profit by them, and that the subsequent learning of the habit by other individuals in the same district took place

by some sort of imitation similar to that referred to by Buxton (1948), though we have no evidence as to the precise nature of the process. It is interesting to note that Thorpe and many other writers have commented on just such a variability of learning ability among individuals.

We would like to thank the many Trust members and other informants for their help and Miss Alison Birch for drawing the map on p. 352.

Photographs illustrating the habit under discussion, by Mr. V. L. Breeze, are published on plates 71 and 72.

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ADDENDUM.

Since this was written Drs. N. and L. Tinbergen have informed us that the habit of opening milk bottles by birds is unknown to them in Holland, where the use of milk bottles with metal foil stoppers is widespread.

HIGH-SPEED PHOTOGRAPHY AS AN AID TO THE IDENTIFICATION OF PREY.

BY

ERIC HOSKING AND STUART SMITH.

(Plates 63—70).

THE use of high-speed flash photography (*antea* pp. 240-1) to obtain photographs of birds has resulted in new standards of clarity and definition, due to the complete lack of movement when exposures of the order of 1/5000th of a second are used. This applies especially to the prey, which previously often showed blurring in the picture, due to movement.

We have submitted a number of Hosking's high-speed flash photographs of birds carrying prey, to Mr. Harry Britten, the well-known Manchester entomologist, and he has been able definitely to identify the following :

- Red-backed Shrike (*Lanius collurio*).
- Hover-fly, *Anasimyia*, probably *transfuga* (L.).
- Small Copper butterfly, *Lycæna phlæas* (L.).
- Small Tortoiseshell butterfly *Aglais urticae* (L.).
- Spotted Flycatcher (*Muscicapa striata*).
- Hover-fly, *Syrphidis ribesii* (L.).
- This Hover-fly is shown in plate 63.
- Blackcap (*Sylvia atricapilla*).
- Harvestman, *Opiliones*.
- Daddy long-legs, *Tipula* ♀ (? *Sp.*).
- Wheatear (*Ænanthe ænanthe*).
- Rat-tailed maggot, *Tubifera* (? *Sp.*).
- Hover-fly, *Syrphidæ* (? *Sp.*).
- Gall-fly, *Trypetidæ* (? *Sp.*).
- Redstart (*Phœnicurus phœnicurus*).
- Mayflies, *Ephemeridæ*.
- Rat-tailed maggot, *Tubifera* (? *Sp.*).
- Wren (*Troglodytes troglodytes*).
- Harvestman, *Opiliones*.
- A spider, *Meta reticulata*, ♀ L.
- Larva of *Noctuid* moth.

The high-speed photographs of Barn-Owls (*Tyto alba*) published in the present number (Plates 64-69) show further examples of prey being brought to the nest which can be readily identified, comprising Short-tailed Field-Voles (*Microtus agrestis*), Long-tailed Field-Mouse (*Apodemus sylvaticus*), Common Shrew (*Sorex araneus*), and a young Water-Vole (*Arvicola amphibius*).

Plate 70 shows the apparatus used in high-speed photography, already described in detail *antea*, p. 240.

NOTES.

SUB-SONG BY YOUNG LINNET

ON May 23rd, 1948, in Dorset, I listened to a young Linnet (*Carduelis cannabina*) singing an extremely quiet sub-song, which was continued for several minutes from the depths of a bramble bush, and was audible only within five yards. Shortly afterwards I saw this bird and three other young ones being fed by their parents. All were fully feathered.

J. R. M. TENNENT.

LITTLE BUNTING IN CUMBERLAND.

ON NOVEMBER 11th, 1948, I saw a bird which I am satisfied was a Little Bunting (*Emberiza pusilla*) associating with a small flock of Linnets (*Carduelis cannabina*) on the railway embankment which runs alongside Siddick Pond, near Workington. It was at once distinguishable from the Linnets in their dull winter plumage by its richer and lighter colouring. The day was dull and rather misty, but at mid-day the light was very good at close range.

The bird was about twelve yards away, perching with the Linnets on a gorse-bush, when first seen, and after a short time it flew up to a higher and nearer hawthorn, eight yards distant. There it was watched for some time before it flew down to the edge of the water and was lost to sight. Unfortunately I could not stay to follow it, but I had had ample opportunity to see the details of plumage and colouring, using 6 × 30 binoculars.

While the bird was among the Linnets the size was seen to be almost the same; if anything it was a shade smaller and perhaps plumper. The build was similar and its beak was conical. The general effect was of a richly-coloured medium-brown bird. The crown was dark chestnut, bordered by a black band running from beak to nape. The back, mantle and wing-coverts were brown with dark centres and buff edgings. The buff edges formed two pale stripes down the back, as with the Reed-Bunting (*Emberiza schœniclus*), and a faint bar on the closed wing. The colour of the rump was not noticed as being a different colour from the rest of the upper-parts. The tail was dark brown with white outer-tail feathers.

Over the eye was a pale buff or whitish stripe, and a black line ran from the beak through the eye, forming the upper border to the rich fawn ear-coverts. There was a black malar stripe. The chin and throat were pale fawn, deepening in colour on the breast and flanks, while the belly and under tail-coverts were paler. The throat, breast and flanks were streaked with dark brown, especially strongly on the breast. The beak appeared to be an indeterminate grey or brown, and the legs were brown.

The only note heard was uttered as the bird flew down to the pond side. It was a single "cheek", not unlike that made by a Reed-Bunting under similar conditions.

Mr. E. Blezard of Carlisle Museum has seen my notes and field sketch (which has also been submitted to the Editor) and he agrees with the identification.

This is the first time that the species has been recorded in Lakeland.

RALPH STOKOE.

"INJURY-FEIGNING" OF GREY WAGTAIL

ON June 6th, 1948, I was passing down the River Ouse at Balcombe Viaduct, near Haywards Heath, Sussex, when I came to a bridge. Immediately I arrived there I heard the agitated calls of a Grey Wagtail (*Motacilla cinerea*). On looking round I saw a female standing on a rock in the river hitting the water with its wings and leaning over sideways; this was repeated and she flew from rock to rock trailing her tail in the water. Under the bridge I found the nest, containing six well grown young, in a crevice where a brick was missing.

D. P. GEOGHEGAN.

[We have recently published another record (*antea*, vol. xli, p. 274) which was the first instance of this behaviour to be brought to our notice. Mr. J. Walpole-Bond, has, however, kindly pointed out to us that he has been acquainted with it for many years and recorded it in his *History of Sussex Birds*, vol. I, p. 268, where he wrote: "Now and then, after the original move from the nest, the bird runs nimbly, yet crouchingly, along the ground for a few yards, whilst on rare occasions—when the nest holds newly-hatched young especially—it trails along with tail and wings fully expanded."—Eds.]

CONCEALMENT OF FOOD BY NUTHATCH, COAL-TIT, AND MARSH-TIT

AT Sidmouth, Devon, on September 28th, 1948, and several following days, I observed Coal-Tits (*Parus ater*) concealing beechmast. The nuts were all taken from the tree, and hidden within a radius from it of about 100 yards.

The places of concealment, which were numerous and varied, included mossy banks, on the ground amidst bracken or dead leaves, in crevices and holes in bark of pine or oak, and once in a tuft of lichen attached to a larch bough. The nuts were pushed or tapped into position, and when on the ground were sometimes covered with dead leaves; at other times moss was pulled about over the spot. On two occasions, birds which secreted nuts in bark crevices appeared to execute head movements which suggested covering, although there was no material near by.

While watching the tits I saw a Nuthatch (*Sitta europæa*) thrust a beech-nut into the ground and cover it with a dead leaf. Another Nuthatch tapped a hazel-nut into a small hole in a branch, and then lichen was plucked from close at hand and placed over the nut. A similar incident was witnessed on May 17th, 1948, when a cock Nuthatch, which had been feeding the incubating hen, brought a hazel-nut, inserted it into a round hole in the stem of a young ash a few yards from the nest, and plugged the hole with lichen.

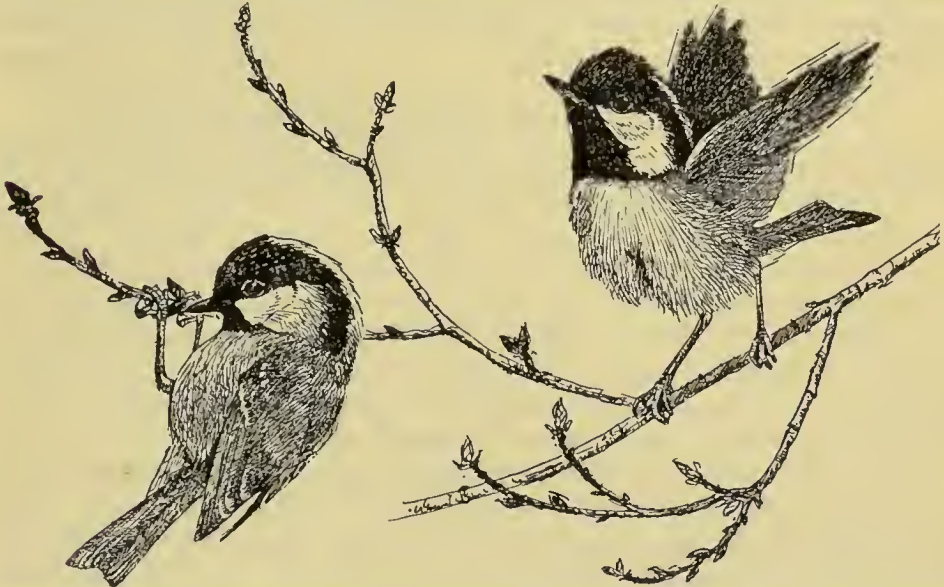
One case of a Marsh-Tit (*Parus palustris*) burying a beech-nut was also observed. T. J. RICHARDS.

[Two records of similar behaviour by tits have been published (*antea*, vol. xxviii, p. 173, vol. xxxix, p. 214), but in each case the birds were concealing small black slugs.—EDS.]

DISPLAY OF COAL-TIT.

WITH reference to the note on this subject by W. G. Teagle, published recently (*antea*, Vol. xli, p. 307), I recorded similar behaviour by a male Coal-Tit (*Parus ater*) in the presence of a female (both birds colour-ringed) in our garden at Aylsham, Norfolk, during January, 1947.

In this instance, however, the display took place among the highest twigs of a damson tree, the male bird holding nothing in his bill meanwhile. Unfortunately, the observation was made



behind a closed window, so no sounds were audible, but the puffed breast-feathers, fluttering wings and Robin-like stance with black throat fully displayed were all very striking. The female appeared uninterested and was later chased through the garden trees with incredible speed and nimbleness. This same pair nested near by again in 1948.

A pen and ink drawing of this display appeared in the spring number of *The Countryman* for that year and is reproduced above.

R. A. RICHARDSON.

EARLY RED-BACKED SHRIKE IN SURREY

WHILST out on a Surrey heath on April 3rd, 1948, I was astounded to see a male Red-backed Shrike (*Lanius collurio*). Such an early date is almost unprecedented, *The Handbook of British Birds* mentioning only one earlier—viz. March 21st, 1880. I had a perfectly good view of the bird and identification was undoubted. I am thoroughly familiar

with the Red-backed Shrike in this area, but never expect to see it until well into May.

H. J. HOFFMAN.

SWIFTS FLYING FROM ONCOMING STORM

AT about 16.00 (B.S.T.) on July 26th, 1946, at Herne Hill, S.E., I was fortunate enough to observe a party of four or five Swifts (*Apus apus*) flying low and very rapidly in advance of an extensive storm-front. The storm was working up from the west with the wind, the entire western sky being intensely dark and threatening, and the birds were travelling at high speed on an easterly course, at roof-top level, presumably endeavouring to outfly it. About ten minutes later, the sky became so dark and gloomy that artificial lighting was necessary indoors. Thunder and lightning accompanied by torrential rain and tempest followed, and continued for the space of nearly forty minutes. I would mention that this observation was made from one of the upper rooms of my home, some twenty-two feet above the ground, facing the south-western horizon.

HUBERT E. POUNDS.

TURTLE-DOVES REARING THREE YOUNG

ON June 14th, 1948, at Burton, Wirral, Cheshire, I found the nest of a Turtle-Dove (*Streptopelia turtur*) in a hawthorn tree some eleven feet from the ground and in such a position that it was not possible to see into it. The nest was in the final stages of building. One of the parents began to incubate on about June 22nd and the eggs hatched on or before July 8th, on which date I saw the parents feeding the young. On July 25th three young birds, which appeared to be of the same size, were perching with the two adults on electric wires near the nest and were seen together until August 22nd.

So far as I know there was no other pair of Turtle-Doves in the immediate neighbourhood, and although I did not actually see the three eggs in the nest there is no doubt in my mind that all three young were hatched in this nest.

J. P. SAVIDGE.

CURLEW AND MALLARD LAYING IN SAME NEST.

ON June 3rd, 1948, my cousin, Frank Penfold and I were walking along the shores of Tingwall Loch, in the Mainland, Shetland. We noticed a Curlew (*Numenius arquata*) flying around in circles over an islet in the loch and waded across to investigate, each from opposite shores. As I approached the islet, I saw a Mallard duck (*Anas platyrhynchos*) slip away into the loch. The top of the islet was covered with deep furrows, normally apparently covered over with heather but the latter had been burnt off at some time previously. We found a Mallard's nest, fully downed, with four eggs and a Curlew's. The Curlew was still flying around in a very agitated manner when we left. We were unable to visit the islet again until June 7th, when the Mallard duck flew off as we landed. The Curlew was still present, again very agitated and flying around in circles. In the nest was a fifth Mallard's egg, newly laid. As

we had to leave Shetland the next day, we were unable to make further observations and find out what eventually transpired.

S. J. LUDGATER.

GREEN SANDPIPERS PERCHING IN TREE

ON August 3rd, 1947, at Little Tring Reservoir, Herts, my attention was attracted by two birds perched on the bare branch of a tree at a height of approximately twenty feet above the ground. Focusing my telescope on these birds I saw that they were a species of sand-piper. Approaching closer I noted the greenish tinge of the legs and when the birds took to flight I observed the white rump, tail, and underparts; the back and underside of the wings appeared dark brown or black. From these characters I identified the birds as Green Sandpipers (*Tringa ochropus*).

The flight was similar to that of the Common Snipe (*Capella gallinago*)—a fast zigzag course for a short distance and a steep climb.

B. L. SAGE.

[It may be recalled that like many other waders the Green Sandpiper perches freely on trees in the breeding-season and indeed commonly lays its eggs in old nests of other birds, which are frequently in trees, but such behaviour appears to be extremely unusual in this country.—EDS.]

WHITE-WINGED BLACK TERN IN BERKSHIRE.

THE occurrence in Berkshire of a juvenile White-winged Black Tern (*Chlidonias leucopterus*) at the Theale gravel-pits on September 14th, 1948, is here placed on record. At first I thought the bird to be a Black Tern (*C. niger*), but it was later evident that this conclusion was not tenable and on comparing my notes with *The Handbook* the real identification was established.

I had the bird under constant observation for well over an hour, from 6.20 p.m. until dusk, and during that period it flew backwards and forwards over one section of the pits, at about 8-10 ft. above the water, now and then twisting down to take food from the surface with its bill and also frequently hawking flying insects. Later it flew very much lower, about a foot high. Immediately before settling for the night, at 7.45, the bird alighted on the surface three times for brief moments, and in the failing light seemed to bob once under the water.

The following description was noted through 8 × 30 binoculars in good light at ranges down to about twenty yards: Forehead and front of crown white; posterior centre of crown and anterior centre of nape black, extending downwards on to upper ear-coverts, with a few dark shadings behind latter—forming a small cap, somewhat irregular in shape; rest of head and neck white. Mantle and back grey, mottled appreciably with brown; rump white; upper tail surface grey. Under-parts white with no dark marks on side of breast in front of wings. Wings grey, coverts and scapulars mottled with brown especially on lesser wing-coverts, making them appear

darker than rest of wing ; under-wing white, secondaries narrowly tipped dark, primaries more widely so. Colour of bill not definitely noted, but certainly dark.

The most conspicuous feature of the bird was the white rump bordered on either side by the darker back and tail. The tail was slightly forked and at rest the wings protruded noticeably beyond it. The bill was particularly noted as being appreciably shorter than the head. Soon after seeing the bird for the first time I commented in my note book that it was certainly smaller than both Arctic Tern (*Sterna macrura*) and Common Tern (*S. hirundo*), and that it resembled Black Tern in size, shape, and habits. Just before the light failed a tern belonging to one or other of the former species flew over, and its larger size was apparent. K. E. L. SIMMONS.

VOICE OF SPOTTED CRAKE

A Spotted Crake (*Porzana porzana*) appeared at Malham Tarn in West Yorkshire during June, 1948, and remained for at least seven days in a marshy area, calling every night. It was first heard on the evening of June 13th by Miss J. Reid, and last heard on the night of June 19th when Dr E. A. R. Ennion was present and confirmed its identity.

The call of this bird was quite unmistakable, and I wrote it down as "H'whit—H'whit" repeated in quick succession. It was like the lashing of a whip, but without the crack at the end, and we could imitate the noise, though too high in pitch, by whipping the top point of a fly-fishing rod quickly through the air. Each note had a very sharp echo from a hillside about 200 yards away, which sounded like the crack at the end of the lashing of the whip and accounted for the report of a farmer near by that he had been disturbed in the night by a bird making a continual tapping noise. No calling was heard by day.

On June 15th it started calling at 21.58, and the rate of calling gradually increased. By 22.15 the numbers of calls for three consecutive minutes were 55, 50, 58, and by 22.50 they were 76, 71, 77. Pauses in the repetition occurred at irregular intervals. On the 16th, it gave five very gentle calls at 21.40, of the usual type but softer and more liquid; it then remained silent until 22.15, when it started in earnest. On the 18th, it started at 22.15 (sunset 21.20), and called continually until 03.15 (sunrise 04.42), when it stopped.

The call could be heard from a distance of at least half a mile on a still night, and at very close quarters a curious grunting noise was also audible, occurring at the same time as the "H'whit" note. Only one very fleeting glimpse was obtained of this crake, in spite of hours of watching, and it called always from a pool which is entirely overgrown with vegetation, mainly *Carex*. It often moved about slowly while calling, and after dark any movement, noise, or the shining of a torch on the bank of the pool made no perceptible difference to its rate of calling; in fact I often got the impression that it moved towards the source of disturbance. On several occasions I shone a torch when

it must have been only two yards from me, judging by the almost deafening noise, yet even this did not make it move away.

In view of the persistent calling of this bird in the same place, and the late date of its arrival, it seems probable that it was an unmated male, which would have bred if a female had appeared.

Comparing the calls of this bird with the various notes described in *The Handbook of British Birds* (vol. v, p. 182), the persistent "H'whit" is clearly the same as the "h'wet, h'wet" of Jourdain, the "peculiar oft-repeated 'whuit-whuit'" of Saunders (not mentioned in *The Handbook*), and probably the same as the piping "hooid, cooid" of Hesse. But I suspect that the sharp "trick-track", described by Ziemer, is a different note. Possibly the few softer and more liquid notes, which I heard only on June 16th, correspond to the liquid "quit" described by Naumann.

P. F. HOLMES.

UNUSUAL BEHAVIOUR OF SPOTTED CRAKE.

ON December 19th, 1948, a Spotted Crake (*Porzana porzana*), was seen by P. E. and J. S. at Earlswood Lakes, Warwickshire.

It was first observed on the outer edge of a flooded reed-bed, and when flushed, alternately swam and dived across 75 yards of open water, using its wings to assist in submerging. It concealed itself under the bank and could not be flushed again.

On February 26th, 1949, a Spotted Crake was seen by A. W. C. and J. S. to fly on to the same water, very probably from the reeds mentioned above and swim rapidly towards the bank. Shortly afterwards, the bird was observed to fly strongly with rapid wing beats to a height of 10-15 feet, over a hedge, and along the length of a narrow field for some 100 yards. The field was of close cropped turf which afforded no cover whatsoever. On being approached the bird flew almost vertically upwards to a height of 40 feet, and dropped into an adjacent copse containing two small reedy pools. During this flight the legs were held under the tail, and the wing beats were strong and rapid.

The characters of the bird, including the olive brown upper-parts spotted and streaked with white, greyish brown neck and breast and yellow bill with red base, were all clearly seen.

A. W. CUNDALL, P. EVANS, J. SEARS.

DISTRIBUTION OF BLACK GROUSE IN NORTH WALES FORESTS

It seems desirable to place on record the following observations on the present status of the Black Grouse (*Lyrurus tetrix*) in North Wales. The observations cover all Forestry Commission Forests in the area.

RADNORSHIRE :

Radnor Forest : Blackgame are said to have been unknown in the forest area 20 years ago, although it is reasonable to suppose that they existed in the general area. They are now known to be present in the Forest in small numbers. A cock and two Greyhens were seen together in the autumn of 1947.

The game bags are interesting. From 1926 to 1937 the grouse bag averaged 48 birds per annum, and no Blackgame were shot during the whole period. Since then, the grouse bags have dropped to an average of 12 birds per annum, but one or two Blackgame are killed each season.

Coed Sarnau : None known.

CARDIGANSHIRE :

1. *Tarenig Forest* (near Llangurig) : They have never been numerous, but an odd one is believed to exist still.

2. *Myherin Hafod* (near Devils Bridge) : Up till 1939 none had been seen in recent years, although there are two stuffed birds at Ty Mawr Farm, said to have been shot locally long ago. There are several Blackgame at Myherin Hafod now.

3. *Myherin Crosswood* (8 miles S.W. of Aberystwyth) : An occasional bird has always been present. They have increased during the war years and now it is possible to see 12 together.

4. *Brynmaur and Cwn Einion Forests* : None known.

MONTGOMERY :

1. *Hafren Forest* (due west of Llanidloes on E. slopes of Plynlimmon) : Up to 1939 Blackgame were very rare. Since the war, they have spread to parts of the forest where they were unknown before.

2. *Dovey Forest* (Machynlleth area) : Small numbers have always been present. They are certainly no less numerous now.

3. *Dyfnant* (near Lake Vyrnwy) : This used to be the forest with the largest stock of Blackgame. They are not so numerous now, but it is still possible to see 5 in a day. They have declined in numbers in this general area—Lake Vyrnwy, Cann Office, Llanbrynmair.

4. *Kerry* : They have never been numerous, but they are still present in small numbers.

5. *Mathrafal* : Never known.

MERIONETH :

1. *Coed-y-brenin* (Dolgelley) : Never numerous, but they are still well distributed through the forest.

2. *Aberhirnant* (near Bala) : This is a new forest area where they are present in small numbers. They used to be more numerous. With the afforestation work starting this year, it is expected that they will increase.

3. *Cynwyd* (Corwen) : Still present, but not so numerous as before the War.

4. *Haford Fawr* : None known.

DENBIGHSHIRE :

1. *Clocaenog Forest* (near Ruthin) : Blackgame are still present in smaller number than before the War.

2. *Coed Clwyd* : A new Forest area. None seen.

3. *St. Asaph* : A new Forest area. None present.

CARNARVON :

1. *Gwydyr Forest* : (Bettws-y-Coed). An odd one is still present, but they have always been rare.

2. *Beddgelert* : None known.

ANGLESEY :

Newborough : None known. A covey mysteriously appeared near Maldraeth, Anglesey, a few years before the War, but has since disappeared.

From the foregoing, it will be seen that Blackgame are still fairly widespread, although in small numbers, throughout North Wales. In some of the Forests, particularly in mid Wales, they are extending their range slowly. On the whole, however, especially in the North and outside Forestry Commission property, they have decreased, in common with all game birds, on those estates where intensive game preservation was practised before the War, but they appear to have decreased less than other game birds and to be generally less affected by game preservation. They certainly seem to like young plantations, possibly more due to the greater abundance of rush, bilberry and scrub growth after sheep grazing is stopped than to the preservation of the trees (although grouse have decreased they are starting to recover again on certain moors—e.g. Llanbrynmair, 280 brace in 1948 which equals an average pre-war bag).

In 1939 I kept a note of all Greyhens' nests that were found in mid Wales on Forestry Commission property. The hatch was 98%.

W. A. CADMAN.

SPOTTED FLYCATCHERS FEEDING ON BERRIES.—We are informed by Miss L. Riches that on July 26th, 1948, she observed a Spotted Flycatcher (*Muscicapa striata*) in her garden at Ipswich feeding two young ones on berries of the Barberry (*Berberis*) and also eating some of the berries itself. *The Handbook* merely records that the species "is said to take berries, such as those of rowan, in autumn".

RINGED BLACK REDSTARTS.—We are informed by Mr. R. A. Richardson that a number of Black Redstarts (*Phœnicurus ochrurus*) caught at Cley Bird Observatory this autumn have been marked with one or two coloured rings in addition to a numbered aluminium ring. Readers are asked to scrutinize carefully any Black Redstarts they may see and, if they see a ringed one, to note the sequence of the coloured rings and to which leg they are attached.

FOOD-WASHING BY WHIMBREL.—Mr. Jeffrey H. Boswall has sent an account of food-washing by a Whimbrel (*Numenius phæopus*), which he observed on May 2nd, 1948, at Rye Harbour, Sussex. The bird picked up from the mud a small round crustacean about $1\frac{1}{2}$ inches in diameter, took it to a pool of clear water a few feet away and there spent about two minutes washing it before swallowing. An earlier record of this habit in the Whimbrel has been recorded in *Brit. Birds*, vol. xxxix, p. 249.

COMMON SNIPE SWIMMING.—A record of Common Snipe (*Capella gallinago*) swimming has already been published (*antea*, vol. xli, p. 276). Mr. Peter Marler has sent a second record: a bird which he was watching at Ham Sewage Farm, Berkshire, on September 15th, 1948, was seen to swim across a settling bed to join two birds on the other side. Lt-Col. B. H. Ryves also draws our attention to a record mentioned by him in his recently published *Bird Life in Cornwall* (p. 224), where it is noted that Mr. T. H. Willcocks "has seen a Snipe swim across a pool, riding high like a Gull".

LETTER.

INTERNATIONAL ORNITHOLOGICAL CONGRESS, 1950.

To the Editors of BRITISH BIRDS,

SIRS,—The Permanent Committee for International Ornithological Congresses has instructed the Ornithological Society of Sweden to organize the 10th International Congress. It is to be held at Uppsala on June 10th-17th, 1950.

According to the preliminary programme the opening of the Congress will take place on Saturday, June 10th, at 2 p.m. Sunday, June 11th, will be devoted to a whole-day excursion; June 12th-17th to congress discussions as well as another whole-day excursion and an afternoon tour. Before and after the Congress, excursions will be arranged to various parts of Sweden.

Ornithologists from all countries are cordially invited to attend. The congress fee is 25 Swedish crowns, and applications should be sent in before the end of February, 1950. Applicants will be furnished with a detailed programme.

At the Congress a few survey lectures will be held by lecturers specially invited. Other members may also lecture or give short announcements.

A preliminary prospectus of the Congress will be supplied on application to the Editor of *British Birds*, 9, Marston Ferry Road, Oxford, and can also be obtained from the following address: 10th International Ornithological Congress, Uppsala, Sweden.

REVIEW.

FAIR ISLE BIRD OBSERVATORY: STATEMENT OF FINANCES AND DIRECTOR'S REPORT.

These mimeographed reports on the work of the Fair Isle Bird Observatory Trust show that excellent progress has been made during the first year. The initial cost of establishing the Observatory, amounting to nearly £5,000, has been met by a generous donation from the Pilgrim Trust and a "long-term loan" from two of the Fair Isle Trustees. Subscriptions received from "Friends of Fair Isle", who already number 700, will thus be available to cover running costs. The Trustees urge their supporters to sign Deeds of Covenant which will have the effect of both guaranteeing and increasing income from this source. At Fair Isle itself considerable progress had been made by the end of 1948 in the conversion of a number of former naval huts at the North Haven for use as a hostel which will provide excellent accommodation for observers.

The Observatory was officially opened on August 28th, 1948, and remained operation until the end of October, so that a full coverage of the autumn in migration was obtained. The report states that the autumn migration was "the poorest for many years." Nevertheless an adult male Rose-coloured Pastor was one of the first autumn arrivals, and a Great Grey Shrike was among the birds caught and ringed in various traps—many of them experimental—which have been erected. Other rare migrants recorded include Little Bunting, Scarlet Grosbeak and Yellow-browed Warbler in addition to others of rather commoner occurrence. Rather over 300 birds were ringed, including some nestlings, one of which, a Wheatear, was recovered in Portugal three and a half months later. In spite of opening in a "poor" season the Observatory appears to have made a very encouraging start.

NOTICE TO CONTRIBUTORS

British Birds accepts papers and notes dealing with original observations on the birds of the British Isles and Western Europe or, where appropriate, on birds of this area as observed in other parts of their range. Review articles on subjects of current ornithological interest will also be considered.

Contributors are asked to observe the following points, attention to which saves the waste of much editorial time on trivial alterations. MSS. if not typed should be clearly written. Authors of papers, especially those containing systematic lists, lists of references, tables, etc., should consult previous papers on similar lines in *British Birds* as a guide to general presentation and set-out, including use of particular type, stops, and other conventions, such as date following the month (January 1st, etc., not 1st January), names of books and journals in italics, not inverted commas, and so on. Capital initial letters are to be used for proper names of definite species: thus "Great Tit," but "flocks of tits." [In systematic lists the whole name should be in capitals]. The scientific name (underlined in M.S. to indicate italics) follows the English name in brackets without any intervening stop. Scientific nomenclature follows *The Handbook of British Birds* or H. F. Witherby's *Check-List of British Birds* based on this, with the qualification that subspecific names should not be used in connexion with field observations except in cases where subspecies are definitely separable in the field, e.g. Yellow and Blue-headed Wagtails, or where their use is necessary in discussion. When the subspecific name (in cases where this is used) repeats the specific name the initial letter only should be used for the latter; otherwise the whole name should be given in full: thus "*Parus m. major*," but "*Parus major newtoni*."

Notes should be drawn up in as nearly as possible the exact form in which they will be printed with signature in BLOCK CAPITALS, and the writer's address clearly written on the same sheet. If more than one note is submitted each should be on a separate sheet with signature and address repeated. Though suitable headings and scientific names can be added by the Editor, if necessary, they should be inserted by authors as far as possible. Communications should always be as concise as possible, though reasonable detail can be given where this is important. Notes or records of subsidiary importance may be abbreviated or otherwise modified by the Editor for inclusion in the section of "Short Notes." Maps or graphs must be neatly and boldly drawn in Indian ink on good quality white paper or Bristol board, with due allowance for reduction when necessary. Authors without experience of making drawings or diagrams for publication are strongly advised to get the help of a skilled draughtsman. Lettering and figures should be inserted lightly in pencil only.

Photographs are accepted primarily as illustrations of papers or notes, but good prints of species rarely or not previously photographed or illustrating important points of habits, behaviour or field characters will also be considered on their own merits.

It is desirable that reports of rare birds should be sent in immediately, as sometimes authentication of a noteworthy record may depend on further observation after advice has been obtained. Such records or other communications of special urgency may be addressed direct to the Editor of *British Birds*, 9, Marston Ferry Road, Oxford, but in general all notes and papers for publication and other editorial communications should be addressed to the Assistant Editor, *British Birds*, 74, Shinfield Road, Reading. Enquiries or requests for information not immediately related to material for publication must be accompanied by a stamped and addressed envelope.

Short notes accepted for publication without material alteration are not acknowledged by post except by special request, but proofs are submitted to the writers in due course. Authors of papers receive twenty separate copies free of charge. Any additional separates required must be ordered when returning the proofs and be paid for by the author.

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BRITISH BIRDS

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THE BREEDING STATUS OF THE STARLING IN WEST WALES.

BY

J. L. DAVIES.

ALTHOUGH the Starling (*Sturnus vulgaris*) is an abundant winter visitor to West Wales, it is local and comparatively scarce as a breeding bird. This has led to confusing statements on the part of past writers who have tended to dismiss the bird as a common resident when such in fact was not the case. For instance, Mathew (1894) refers to the species in Pembrokeshire as "Common resident" and Salter (1900) gives its status in north Cardiganshire as "Resident. Numerous," when in reality the expressions "common" and "numerous" refer to winter visitors. Extensive ringing of Starlings in Britain and on the Continent, both in winter and in the breeding season, has not revealed a single case of a foreign immigrant which remained to breed here, so that it is reasonable to assume that the British breeding population is unaffected by these winter visitors. Furthermore, the sedentary nature of British resident adults and most young, and the homing tendency of those which do migrate, mean that increase of a local population will be effected mainly by its own efforts rather than by any influx from outside (Carrick *in litt.*).

In April and May of 1947, the writer was prompted by Dr. Robert Carrick to make a census of breeding Starlings within an area in south Cardiganshire which covered nearly 80 square miles. The area included a variety of habitats and two large villages with populations of over 1,000, but, in spite of a thorough search, not one Starling was seen. The local inhabitants had never heard of Starlings breeding in the vicinity and regarded their arrival as a sign of impending snow. Indeed "aderyn-yr-eira," which is the common Welsh name for the species, means "snow-bird." As a result of this, the writer attempted in 1948 a survey of the breeding distribution of the Starling throughout the three counties of Cardigan, Carmarthen and Pembrokeshire. Much of this survey was done personally but the following observers contributed valuable notes:—H. Allen, J. H. Barrett, M. Bishopp, C. G. Cartwright, P. J. Conder, W. Condry, B. H. Davies, E. H. Davies, T. Davies, E. O. Elsdon, D. E. G. Evans, H. J. Evans, F. Fairclough, W. Miall Jones, R. M. Lockley, P. J. Panting, G. C. Porter, J. B. Say, W. Simister, J. F. Thomas, A. R. Watts and N. Wylie-Moore.

The region was covered fairly thoroughly with the exception of some small areas in the industrial south-east of Carmarthenshire. The Starling is such a readily recognizable bird and is so conspicuous while nesting that it forms a very suitable subject for a study of this kind and it is thought that no significant numbers were overlooked.

10 JAN 1950

10 JAN 1950

THE PHYSICAL BACKGROUND.

West Wales is made up of the three counties of Cardigan, Carmarthen and Pembroke. The upland moors of the east are continued westward in the form of long ridges of high land intersected by the two main river valleys—those of the Teifi and the Towy—and the only extensive areas of land below 500 feet are in south and central Pembrokeshire. Cultivation is carried on in nearly all districts to a height of 800 feet and in some parts to 1,000 feet. By far the most important agricultural activity is the keeping of cattle for milk, although this is replaced by sheep farming on the eastern hills. Map 1 shows the distribution of all towns and villages with a population of over 1,000 inhabitants. Apart from the general tendency



MAP 1. MAP OF WEST WALES SHOWING POSITION OF HUMAN SETTLEMENTS WITH OVER 1,000 INHABITANTS.

towards a concentration along the south coast, the most noticeable fact about this distribution is that all these towns and villages (with the exception of Tregaron in Cardiganshire) are situated at less than 500 feet above sea level. The extreme south-east of Carmarthen-shire is the only extensive industrial area, and here anthracite mining and tinplate manufacture are carried on.

THE PAST BREEDING STATUS OF THE STARLING.

There is no evidence to show that the Starling bred in West Wales before about 1850 and Alexander and Lack (1944) consider that it spread into the region between 1830 and 1860. Owen (1603) mentions the species, but does so in a context suggesting that it was a winter visitor only. Mathew (1894) quotes James Tracey to the effect that a few pairs nested in Pembrokeshire about 1850 and

had increased in number. Mathew himself recorded that in 1880 it was "only then a nesting species in a few localities" (in Pembrokeshire), but that by 1888 it "appeared to be rapidly establishing itself throughout the county." Even at that date, however, he quotes a Mr. Jefferys to the effect that "the Starling is decidedly rare during the breeding season in the neighbourhood of Tenby." Salter (1895) states that it was then absent as a breeder from many of the hill districts and also from the upper Towy valley. Little or nothing has been recorded about breeding in the present century.

THE PRESENT BREEDING STATUS OF THE STARLING.

The following is a detailed list of breeding records for 1948.



MAP 2. MAP OF WEST WALES SHOWING POSITIONS OF STARLING COLONIES.

CARMARTHENSHIRE.

Clynderwen : one pair seen feeding fledged young at the end of May (E.H.D.).

Laugharne : two or three pairs seen carrying food in breeding season in neighbourhood of the castle (J.F.T.).

Carmarthen : about 10 pairs, mostly in and around the castle, but also Peniel Street (J.L.D.).

Llandilo : a considerable number breeding (G.C.P.).

Llandovery : adults seen feeding fledged young on June 9th ; also adult seen flying from chimney pot (J.L.D.).

Ferryside : one pair breeding in school roof ; possibly more (J.L.D.).

Kidwelly, Pembrey and Burry Port : birds seen from the train throughout the breeding season (J.L.D.).

Llanelly : nests commonly; also perhaps in farms near by (A.R.W.).

Felinfoel : at least one pair nesting (M.B.).

Hendy : three nests near Hendy green and four or five in the disused part of Hendy works (M.B.).

Blaenau (Ammanford) : adult seen carrying food to nest (J.L.D.).

Pen-y-groes (Ammanford) : several pairs breeding (J.L.D.).

CARDIGANSHIRE.

Borth : three or four pairs feeding young at the south end of the village (W.C.).

Aberystwyth : probably no more than a dozen pairs, mostly near the harbour but also in Queen's Road (W.M.J., J.L.D.).

Llanon : one small group of about five pairs and a few others scattered; probably about ten in all (J.L.D.).

Aberaron : about fifteen pairs scattered through the town (J.L.D.).

New Quay : two pairs nesting near the Queen's Hotel (J.L.D.).

Tregaron : about ten pairs nesting near the railway station (J.L.D.).

Lampeter : fairly common and nests in villages near by (D.E.G.E.); about thirty pairs nesting, mostly around the workhouse (J.L.D.).

PEMBROKESHIRE.

St. David's : about twenty pairs nesting, mostly in the main street (J.L.D.); one pair Lleithyr Farm (H. Allen).

Trevine : small colony (P.J.P.).

Skokholm : two nests in a corrugated iron hut and four in cliffs near by (P.J.C.).

Dale : one pair nesting in a corrugated iron shed at West Blockhouse were the only birds nesting in Dale parish (J.H.B.).

Pembroke Dock : one pair nesting in railway locomotive sheds, possibly others (B.H.D.).

Pembroke : colony of about ten pairs in the centre of the town (N.W.-M., E.O.E., J.L.D.); one pair Woodbine House Hospital (C.G.C.); one pair Old Post Office yard (E.O.E.).

Angle : one pair seen sitting about close together but apparently not breeding (N.W.-M.).

Tenby : birds seen carrying food during May but no estimate of numbers (J.L.D.).

The distribution of these breeding stations is shown in Map 2. The sites fall into two main groups : first, those along the shores of Cardigan Bay from Borth to New Quay together with the inland sites of Tregaron and Lampeter; second, those along the coastlands of south Carmarthenshire and Pembrokeshire from the industrial south-east of the region to Skokholm and St. David's in the west. These two groups may represent the initial lines of spread—one through the Severn-Dovey depression into north Cardiganshire and one from the Glamorgan plain along the south coast of Wales. Between these two groups is an area in which the species does not appear to breed at all. This includes the coast of

Cardigan Bay between New Quay and Trevine, the lower Teifi valley and much of mid-Pembrokeshire. In this area the following towns and large villages (human population 1,000-7,000) were searched without success: Fishguard, Goodwick and Newport (P.J.P., F.F., R.M.L.); Haverfordwest (W.S., J.L.D.); Cardigan, Aberporth, Newcastle Emlyn, Llandyssul and Llanybyther (J.L.D.). Information from Milford Haven was inconclusive.

Of the three counties, Cardiganshire alone was covered with sufficient accuracy to enable a good estimate to be made of the total number of nests. It would seem that there were approximately 85 pairs of Starlings nesting in this county in 1948.

Within the entire region breeding appears to take place only at heights of less than 500 feet above sea-level. The sole exception is at Tregaron, where the nests were at about 550 feet. It is doubtful, however, whether this is of any real significance by itself, for in West Wales the Starling is almost entirely confined as a breeding species to towns and large villages, which, it has already been pointed out, are themselves only found below 500 feet.

BREEDING HABITAT.

With three exceptions all nesting appeared to take place in towns and small villages. These three exceptions were in the extreme west at St. David's, Dale and Skokholm Island, where a farm building, isolated sheds and sea cliffs were used. A fourth possible exception was at Llanelly, where A. R. Watts reported seeing Starlings all the year round at farms outside the town, but was unable to confirm breeding. Otherwise all reports were of urban breeding in the fullest sense of the word. No nests were recorded from woods, quarries, farms, hamlets or other rural sites typical of the species in those parts of its range where it is more abundant, even though special precautions were taken to ensure that observation in the rural areas was not neglected.

Nests in holes in trees were recorded on two occasions—at Pembroke and at Aberærón—but in both cases the trees were in the middle of towns. At St. David's five or six nests were found in ivy on the wall of a house, but in all other instances nests were placed in buildings—under the eaves, in holes in roofs and in chimneys.

Some slight evidence was collected which may indicate that rural sites were used rather more freely in the past. From Llandilo, G. C. Porter wrote that "certainly the Starling has bred in the rural area in the past and I have no doubt that it does so still." He was, however, unable to check the last part of his statement. M. Bishopp reported from Hendy that "some years ago they nested in a hollow tree" in a coppice and that they did not now nest in trees in her garden, where there was once a nest "some years back." According to W. Miall Jones, a pair nested under the roof of a farmhouse near Aberystwyth "some years ago." He also has a note of a pair which nested for three years about 1940 in a hole in

an elm tree on the outskirts of the town. E. O. Elsdon wrote from near Pembroke, "I know they used to breed quite freely locally both in the woods and in almost any school or chapel eaves." The present writer has a note of a pair which nested near Pembroke in 1939 in a hole excavated by Green Woodpeckers (*Picus viridis*). It is of interest also to note that Mathew (1894) records "numerous nests in hollow trees" in the grounds of his residence in north-west Pembrokeshire.

In general it would seem that the Starling has established itself primarily in urban areas and perhaps spreads to the surrounding countryside only when its population is at a peak (see below).

FLUCTUATIONS IN NUMBERS.

There is nothing to show that the Starling has ever been a common or widespread breeding bird in West Wales. The available data would suggest that whereas there was an initial colonization in the first half of the nineteenth century, the species never established itself firmly and there have probably been only minor fluctuations in numbers since then.

The admittedly small amount of evidence collected during the present survey points to a population decrease during the last seven or eight years. Apart from the reports quoted in the section on breeding habitat, the writer has noted a marked decrease within the town of Carmarthen during the last eight years. This decrease has been of the order of 50% and not only do fewer birds nest at existing sites but many former sites have been entirely abandoned. C. G. Carwright reports a marked decrease in Pembroke, but states that there it has occurred since 1946.

On the other hand there is evidence of an increase and spread at two points. On Skokholm, Starlings first bred in 1940 when there was one pair present (R. M. Lockley *in litt.*). P. J. Conder informs me that they have now increased to eight pairs and have spread to the sea-cliffs. Lockley also reports a single nest on Skomer in 1946, but there were certainly no Starlings nesting there in 1947 or 1948. At New Quay in Cardiganshire, no birds were seen during the breeding season of 1947, but two pairs were found nesting in 1948. It is perhaps noteworthy that Skokholm is at the western end of the southern range of the species in West Wales and that New Quay is at the western end of its northern range. Thus there may be some extension of range even though the numbers within that range may be decreasing.

RELATIONS WITH OTHER SPECIES.

The two species with which the Starling comes into contact at its nesting sites in West Wales are the Jackdaw (*Corvus monedula*) and the Swift (*Apus apus*). Both are very common throughout the three counties and are noticeably so in towns and villages where the Starling is absent. Both have been observed to nest in holes formerly used by Starlings, but in all cases the evidence showed that they had taken over vacated holes rather than

that they had ejected the Starlings. At Lampeter, Starlings were seen to chase Swifts which came too near to their nesting sites and in general it is thought that the abundance of Swifts and Jackdaws is due to the lack of Starlings rather than that the reverse is the case.

One factor which has certainly affected the number of breeding Starlings in West Wales is the cold weather. In particular, after the very cold early spring of 1947, the writer came across many Starling corpses in holes in cliffs, trees and ruined buildings.

SUMMARY.

The Starling is a local and comparatively scarce breeding bird in West Wales. Breeding is almost entirely confined to towns and large villages below 500 feet, although there is some evidence that this restriction was not so marked some ten years ago, when the population was probably somewhat greater. The species has never become widespread since its arrival in the region as a breeder in the first half of last century and, in spite of probable minor fluctuations in numbers, has still not colonized large parts of the region which seem eminently suited to such colonization. The only factor which can be suggested as influencing population is the weather.

ACKNOWLEDGEMENTS.

My thanks are due to those observers whose names have already been mentioned and who have provided much of the material which has formed the basis of the above account; also to Mr. W. B. Alexander and Dr. Robert Carrick whose help and criticism have been most valuable.

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BIRDS OF INNER LONDON, 1948

COMPILED FOR
THE LONDON NATURAL HISTORY SOCIETY
BY
C. B. ASHBY.

THE forty square miles of Inner London which have been the subject of an annual report in *British Birds* since 1929 (*vide antea*, Vol. xli, p. 335) include part of the River Thames, seven large parks, numerous squares and gardens, and many partly-cleared bombed sites. The notes which follow have been selected from records of 82 species seen during 1948.

Thanks are due to the Records Committee of the London Natural History Society, to Mr. D. C. Pegram for help with entering, to the following observers, and to the many others whose observations are not published here but which have nevertheless helped to widen and confirm our knowledge of the status of many of the commoner species: T. L. Bartlett, S. Cramp, P. W. E. Currie, D. Goodwin, P. J. Hayman, R. W. Hayman, S. D. Herington, Sir Cyril Hurcomb, C. E. Hutchings, Mrs. H. M. Rait-Kerr, Dr. G. Carmichael Low, Miss E. McEwen, J. McHoul, F. J. L. Mitchell, E. M. Nicholson, R. Osborn, D. F. Owen, C. H. F. Parsons, R. A. Richardson, G. Taylor, W. G. Teagle, K. D. B. Thomson, A. E. Vine, Prof. E. H. Warmington, E. C. Watt, C. A. White.

ROOK (*Corvus frugilegus*).—Smithfield Market, three flying south on April 12th (C.A.W.) This is the first Inner London record since 1940.

JACKDAW (*Corvus monedula*).—Kensington Gardens, at least three pairs bred in the south-west corner of the gardens, an old-established nesting site (G.C.L.), and one pair near the Orangery, a quarter of a mile to the north-west (E. McE., C.H.F.P.).

JAY (*Garrulus glandarius*).—Noted in the Central Parks from January to April and from August to December, but the only definite evidence of breeding was of two pairs in Kensington Gardens (G.C.L., W.G.T. *et al.*). In Battersea Park it was regularly seen, and of six-eight noted from June onwards most were birds of the year (E.M.N., R.O.).

GREENFINCH (*Chloris chloris*).—Kensington Gardens, one pair nested (E. McE.); non-breeding records from Battersea Park, Hyde Park, Green Park and Regent's Park.

LESSER REDPOLL (*Carduelis flammea*).—Kensington, about eight in Cornwall Gardens on February 1st (Capt. C. H. B. Grant, *per* G.C.L.).

BULLFINCH (*Pyrrhula pyrrhula*).—Kensington Gardens, one on July 14th, 20th and August 21st (E. McE., J.McH.).

CHAFFINCH (*Fringilla cælebs*).—A pronounced north-westerly migration was noticed through Green Park, St. James's Park and Kensington Gardens between October 6th and November 3rd. Counts of birds in flight between 8.15 and 8.40 a.m. or 8.00 and 8.30 a.m. B.S.T. resulted in 61 on October 6th, 525 on October 15th,

c.330 on October 20th, 31 on October 21st and 164 on November 3rd, the birds passing through in small parties or in flocks up to 70. Some migrating parties alighted in Green Park for varying periods before departing northwards (W.G.T.).

GREY WAGTAIL (*Motacilla cinerea*).—Non-breeding records of up to three from the built-up areas as well as the parks, disused static water tanks being particularly attractive.

PIED WAGTAIL (*Motacilla alba yarrellii*).—Cripplegate bombed area, two pairs present all summer were seen carrying nesting material and insects, and fledged young were noted in June and July (S.D.H., E.H.W.).

TREE-CREEPER (*Certhia familiaris*).—Kensington Gardens, one on April 5th, November 19th and December 18th; three or four with a mixed party of tits on October 16th (E. McE., G.C.L., W.G.T.). The park keeper, Sgt. Guthrie, reported seeing one carrying nesting material. Hyde Park, one on November 24th (W.G.T.). Regent's Park, one singing persistently on February 11th and March 10th (E.H.W.).

NUTHATCH (*Sitta europæa*).—Kensington Gardens, one on September 30th (C.H.F.P.).

GARDEN-WARBLER (*Sylvia borin*).—Kensington Gardens, one on August 9th (J.McH.).

BLACKCAP (*Sylvia atricapilla*).—Kensington Gardens, one on May 12th and 13th (J.McH.).

WHINCHAT (*Saxicola rubetra*).—Noted on passage in the bombed areas of the City: one on May 7th and 10th, two on September 4th, one on September 13th (S.D.H. *et al.*).

REDSTART (*Phœnicurus phœnicurus*).—Between Cheapside and Gresham Street, a cock sang between May 30th and June 4th (S.D.H., G.T.). Kensington Gardens, a cock was seen on April 14th (R.W.H., C.H.F.P.), and one was reported by the keeper on May 11th.

BLACK REDSTART (*Phœnicurus ochrurus*).—Eight pairs bred in the City, where the species has now nested for seven successive years, and a ninth pair bred in Westminster School. A number of unmated males, most of which were in immature plumage, apparently took up territories in various other parts of Inner London, including districts where nesting has not yet been recorded (P.W.E.C. *et al.*).

GREEN WOODPECKER (*Picus viridis*).—Kensington Gardens, an adult and an immature between August 30th and October 10th (E.McE., W.G.T.). Regent's Park, one on March 10th (E.H.W.).

LESSER SPOTTED WOODPECKER (*Dryobates minor*).—Kensington Gardens, one on March 18th, November 18th and 19th (D.G., G.C.L., E.McE.).

LITTLE OWL (*Athene noctua*).—Regent's Park, one on May 2nd (A.E.V.).

PEREGRINE FALCON (*Falco peregrinus*).—St. James's Park, a tiercel seen circling over the lake at midday on October 4th (E.M.N.).

KESTREL (*Falco tinnunculus*).—Pairs were seen frequenting various church spires and other tall buildings, but nests were found only at Hammersmith (F.J.L.M.) and Lambeth (T.L.B.).

BUZZARD (*Buteo* sp.).—One which was watched for seven minutes soaring over the Houses of Parliament on January 8th once descended to the level of Big Ben before going out of sight in the direction of Charing Cross (T.L.B.). One was seen over Lord's Cricket Ground on March 21 (H.M.R.K.) and one was reported by the Zoo staff in flight over Regent's Park towards the end of August (R.A.R.).

BEWICK'S SWAN (*Cygnus bewickii*).—A good view was obtained of one swimming on the Serpentine about ten yards from the bank on March 6th. It swam away when approached and presently flew up, making two circuits at 50 feet, calling (S.C., K.D.B.T.). This is the first record for Inner London.

SCAUP-DUCK (*Aythya marila*).—Kensington Gardens, an immature drake and later an adult drake were seen by many observers on the Round Pond and Long Water between January 1st and March 26th. St. James's Park, a duck on September 25th (S.C.)

GOLDENEYE (*Bucephala clangula*).—The brown-headed bird recorded in 1947 (*antea*, Vol. xli, p. 337), considered to have been an immature male, was seen on the Round Pond and on St. James's Park lake on 23 dates between January 6th and April 15th. On the dates when it was noted at one locality it was not seen at the other. It was joined by another at St. James's Park between February 7th and 17th (T.L.B., C.H.F.P., G.T. *et al.*).

GOOSANDER (*Mergus merganser*).—Kensington Gardens, a brown-headed bird in flight over the Long Water on March 9th (J.McH.).

SMEW (*Mergus albellus*).—Kensington Gardens, a brown-headed bird on January 3rd (C.H.). St. James's Park, one brown-headed from March 7th to 9th (P.J.H., H.M.R.K., E.C.W.).

RED-THROATED DIVER (*Colymbus stellatus*).—Hyde Park and Kensington Gardens, one was seen on the Serpentine and the Long Water on February 9th; the following day it was seen lying on the bank and on the 11th found dead, badly oiled (J. McH., G.C.L., D.F.O., C.H.F.P.).

STOCK-DOVE (*Columba ænas*).—Kensington Gardens, one pair nested (G.C.L., E.McE., C.H.F.P.).

DUNLIN (*Calidris alpina*).—Kensington Gardens, one by the basins at the head of the Long Water on April 23rd (C.E.H.).

RAZORBILL (*Alca torda*).—Thames at Westminster, seven on the water on October 5th eventually flew up river at a height of 40-50 feet. At least two were immature (W.G.T.). Kensington Gardens, one immature which was present on the Round Pond from October 6th to 18th was frequently watched catching small fish and occasionally was seen on the bank. No signs of oiling were visible (G.C.L., W.G.T. *et al.*). These are the first records for Inner London since five were seen at Blackfriars Bridge on November 20th, 1911 (*antea*, Vol. xxii, p. 244).

BREEDING OF THE NORTHERN GOLDEN PLOVER ON ST. KILDA.

BY

JAMES FISHER, I. J. FERGUSON-LEES AND HAMISH CAMPBELL.

" PLOVERS " were noticed on St. Kilda in 1697, by Martin Martin (1698), who arrived there on June 12th (present calendar), and by Macaulay (1764), who stayed on the islands from June, 1758, to July, 1759. Neil MacKenzie, who was minister from 1829 to 1843, according to MacGillivray (1842), had " occasionally observed the Golden Plover." Heathcote (1900), in the summer of 1898, saw a party of the Golden Plover (*Pluvialis apricaria*) more than once on the high plateau of Mullach Mòr on Hirta. Eagle Clarke (1912), who was on Hirta from September 1st to October 8th, 1910, and from September 1st to October 12th, 1911, saw five Golden Plover on September 2nd, 1910, the first day on which he visited the high ground. In 1910 he " observed them in similar haunts throughout our visits, often in considerable numbers. In 1911 it was numerous on the high ground from September 5th to our departure. There was a big arrival on September 30th."

In 1931 the Oxford-Cambridge expedition (Buchan, Harrison, and Lack, 1932), on Hirta from July 22nd to August 13th, found a migratory party of four birds on August 10th, on Mullach Sgar, a tableland bordering Mullach Mòr. In 1939 the *Escape* expedition (Nicholson and Fisher, 1940) was on Hirta from May 31st to June 2nd, and three Golden Plover were flushed on Mullach Sgar on June 2nd. To this date, then, all records seem to have been of birds on passage.

In 1947 the *Heather* expedition (Fisher, 1948) was at St. Kilda on June 10th-13th and 16th-19th. On Mullach Sgar two pairs of Golden Plovers were found in possession of territories on June 11th. On June 19th, J. Naish found a week-old young one, after some searching; its parents were identified in the field as Southern Golden Plovers, *Pluvialis a. apricaria*. This was the first breeding-record for the species on St. Kilda.

Mullach Sgar is a table-land between 700 and 800 feet above sea-level, with a short carpet of grass, some stunted heather, and many patches of gravel and pebbles clothed only in moss.

In 1948 an expedition, composed mostly of members of the University of Edinburgh and including the writers, was on Hirta from July 10th to 21st. When the expedition landed, a pair of Golden Plovers was immediately noticed at a place about 200 feet above sea-level, behind the village, called An Lag Bho'n Tuath. This place is a valley of short grass, with many small outcrops of the granite of which this part of St. Kilda is composed. On July 12th a 5-6 day young one was found and ringed. Its parents had already excited the comment " very well-marked," and, being

fairly tame, were carefully examined at close range, in good light, by several observers through powerful glasses on July 13th.

The following field-description was written down by I.J.F.-L. and is confirmed by the other observers :—

Face and checks black-brown (lighter in ♀), this colour extending in thin band across fore-part of forehead. Throat, breast, belly and most of under-parts pure black. White band across forehead, over eye, down sides of neck and breast, broadening across flanks to vent and under tail-coverts, which were purer white, and white on a larger area than in the Southern Golden Plover. White band particularly broad on flanks of ♂. ♀ had a *few* golden feathers in the white band. Primaries very dark black-brown. Crown, back of neck and rest of upper-parts appeared to be more “ beautifully ” marked than in *apricaria*—more contrast between gold and brown. Bill black, pinkish at base. Legs dark olive-grey.

The legs and feet of the young 5-6 day bird were of a very deep olive-grey—much darker than in the illustration in *The Handbook*, Vol. iv, pl. 121 (p. 364).

The pair of birds was assigned to the Northern form, *Pluvialis apricaria altifrons*, and the occasion constitutes the first British breeding-record of this subspecies.

Another single bird of this form was also seen on top of Mullach Sgar on July 15th, and another there on July 16th.

The breeding pair was photographed without a hide (pls. 82 and 83) by Dr. Frank Darling, with a telephoto lens on a Leica III ; the photographs show the plumage well, and the tundra-like ground on which they were breeding.

On May 21st, 1949, one of us (J.F.), having returned to St. Kilda, worked over the ground on which Golden Plovers were seen in previous years, and other suitable ground. A pair of obvious Southern Golden Plovers was holding a territory on Mullagh Sgar ; there was none behind the village, and, indeed, no sign of any other Golden Plovers on Hirta.

The subspecies *apricaria*, the “ no-white band ” form, is found breeding in the British Isles, and not far from the shores of the Heligoland Bight, the Skagerak, Cattegat and South Baltic. North of this, to Iceland, the arctic shore of Northern Europe and the Yenesei, it is replaced by *altifrons*. But this replacement is apparently not strict or clear-cut, as there is a belt from Færoe to Lithuania, where the situation is not simple. Examination of skins at the British Museum (Natural History), by kind permission of the Keeper of Birds, shows that by no means all male birds within what is regarded as the range of *altifrons* have the simple broad white band which, as *The Handbook* describes it, “ extends over each eye, down sides of neck and breast, where it widens out forming a clear white patch on each side of breast ; lores, ear-coverts, cheeks and throat black-brown ” : and not all females are as distinct from the *apricaria* females as the *Handbook* description suggests.

In many cases the males have the white band of varying widths and spotted and flecked with brown and gold, and the females seem to lack the band partly, or even almost completely.

One of us (J.F.) visited Iceland in June, 1949, and carefully studied numbers of *altifrons* in the grassy meadows, where the race is common. He came to the conclusion purely from field observations, that not all Iceland birds were as extremely black-brown and white as were the St. Kilda birds of 1948. On many males the white band was weak over the eye, and much flecked in its wider, lower portion. Some females approximated to *apricaria*. In the British Museum there are three Iceland males and four females. One female (July) has no white band over eye and down sides of neck, and only a thin fore-stripe; another (July 4th) is very similar; the two others (June 10th and July 5th) have eye- and neck- stripes, but not well marked. On one male (June 1st) the eye-stripe is not well marked; on another (July 4th) the eye-stripe and fore-stripe are both faint—on both the face is lighter brown than the throat; a third (June 1st) is as described in *The Handbook*. Mr. George Yeates photographed a breeding male in North Iceland in 1948 (pl. 77) which he regards as a fairly typical one, and of which he points out that the white "judge's collar" down the breast side is flecked with black and brown. These deviations from *The Handbook* description must not be exaggerated, however; there is no doubt in the mind of the field-observer from Britain, first meeting Iceland birds, that he is in the presence of a very different form.

Such, however, is not the case in Færoe, the type-locality of *altifrons*. K. Williamson (1948) points out that not all the breeding birds of these islands can be assigned to *altifrons*: some are quite indistinguishable from *apricaria*, others "could perhaps best be described as intermediates." In Shetland our informants (B. W. Tucker, L. S. V. Venables, Dr. G. Carmichael Low, J.F.) are unanimous in recording, from field-observations, that breeding birds are *apricaria*. Birds with a considerable degree of white-band plumage have been seen by L. S. V. Venables feeding on cultivated land in Shetland in the breeding-season; but they have not been seen on the breeding hills. Two Shetland skins (June 8th and 15th) in the British Museum are orthodox *apricaria*; a third (male) taken at Sound near Lerwick by H. F. Witherby on June 2nd, 1942, with large testes, had the chocolate face of *altifrons*, but somewhat flecked with gold and white and a white band, faint over the eyes but clear and broad on and below the neck—this bird resembles many seen in Iceland; there is, of course, no proof that it was actually breeding in Shetland.

In Orkney the Golden Plovers belong to the southern race, as is shown by A. C. Meinertzhagen (1921). Two skins in the British Museum are orthodox *apricaria*.

In Scandinavia and N.W. Russia the geographical line of demarcation between the forms has not been clearly defined; the form breeding rarely in Oesel is *apricaria*, while that breeding rarely in the Baltic states is *altifrons*. There is no doubt, however, that in the arctic and north the perfection of *The Handbook* description is attained, except that all males seem to have at least a few light flecks on their face. A male from Vadsö (Arctic Norway), June 23rd, 1895 (Witherby) has a not-very-well-marked eye stripe and some gold and white on its face; but four June males from the N.W. Russian arctic have a pure, wide, clear stripe from forehead to breast, and only relatively few white flecks on their faces. Extreme *altifrons* plumage of this type is well shown, G. K. Yeates informs us, in P. O. Swanberg's photographs of birds nesting in Swedish Lapland, in his *Fjällfåglars Paradis*. [Mr. Swanberg's photographs are published as plates 73-76 of the present issue.—EDS.]

The conclusion seems to be that between *apricaria* and *altifrons* there are intermediates, and that these are found in an intermediate region. But in this region, which includes Iceland, Faeroe and parts of the Baltic, the forms are not arranged in a simple cline; they are very variable and include birds referable to each terminal form. A pair of such birds, referable to the terminal form *altifrons*, bred on St. Kilda in 1948, within the region normally occupied by *apricaria*.

The *Handbook* description of *altifrons* is of the extreme form from Arctic Europe, and perhaps should be modified to fit those Northern Golden Plovers recognizable in early autumn migration in Britain, which have been proved to include members of the Iceland breeding-population.

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STUDIES OF SOME SPECIES RARELY PHOTOGRAPHED.

XXIII. THE NORTHERN GOLDEN PLOVER.

Photographed by OLOF SWANBERG, G. K. YEATES AND
DR. K. J. CARLSON

WITH

PHOTOGRAPHS OF BRITISH BREEDING BIRDS BY ERIC HOSKING
AND H. MORREY SALMON FOR COMPARISON

AND

A NOTE ON RACIAL VARIATION IN
GOLDEN PLOVERS

BY

B. W. TUCKER.

(Plates 73-81, and 84.)

THE PHOTOGRAPHS now published form an appropriate accompaniment to the paper by Messrs. Fisher, Ferguson-Lees and Campbell on the breeding of a pair of Golden Plovers of the Northern type on St. Kilda (p. 379). Mr. Swanberg's photographs (plates 73-76), taken in Swedish Lapland, in a valley south of Svaipa (latitude $66^{\circ} 16'$), show breeding examples of the Northern race (*Pluvialis apricaria altifrons*) in its most pronounced form, having in the male an intensely black face and breast bordered by a conspicuous and sharply defined band of pure white. The female (plate 75) shows the typically dingier face pattern of that sex. Mr. Yeates's photographs taken in Iceland give some idea of the variation found in males of the Northern form. Plate 78 shows a very well-marked bird closely similar to the Lapland examples. The bird in plate 77, on the other hand, though showing unmistakably the bold pattern of the Northern race, displays a slight but definite admixture of coloured feathers in the white band. It is worth remarking that the male of plate 78 was paired with a distinctly dingy female (plate 81, upper fig.). These photographs may be compared with Mr. Hosking's photographs of the Southern race (plates 79 and 80) and those of the St. Kilda breeding birds in plates 82 and 83, the latter showing quite adequately, in spite of their small scale, the characteristic *altifrons* pattern. Plate 79 and plate 80 (right hand figure) show males taken in Inverness-shire and Orkney respectively. The difference from the Northern race is striking, but some Southern males are less strongly marked than these. The left hand figure of plate 80 shows a Yorkshire female, illustrating well the extremely dingy pattern of most Southern examples of that sex, the white band being scarcely more than indicated and the black much obscured.

The fact of both members of the St. Kilda pair showing the *altifrons* pattern is favourable to their being birds of genuinely northern origin, that is to say true examples of *P. a. altifrons*;

yet it seems desirable to draw attention to the fact recently emphasized by the writer in *British Birds* (pp 193-196) of the occasional occurrence in particular races of birds of individual variants resembling the normal form of another race. In this connexion particular interest attaches to Col. H. Morrey Salmon's photograph (plate 81, lower fig.) of a male taken near the nest in Breconshire. This bird would pass for a typical example of the Northern form, and it may of course be actually a specimen of this race breeding far out of its normal range, but the possibility that such a bird nesting as far south as Wales might be a variant of the Southern form certainly cannot be excluded.

NOTES.

RUBBER IN CASTINGS OF ROOKS AND JACKDAWS

I CAN provide a further indication that the tendency of Rooks (*Corvus frugilegus*) to swallow rubber objects is widespread (*vide antea*, p. 52). On April 6th, 1934, I examined the debris under a rookery at Le Vesinet (S. & O.), not far from Paris, and noticed considerable numbers of rubber rings and washers, though I saw no pieces of rubber sheeting. These varied from small thick washers from beer bottle stoppers to thin 2" rings cut from sections of old bicycle inner tubes. I noticed particularly that the predominant colour was red, with perhaps 20% orange and 10% white.

G. R. MOUNTFORT.

THE following further evidence of the tendency of Rooks and Jackdaws (*Corvus monedula*) to swallow rubber objects may be of interest.

In 1931 and 1932 my attention was drawn by a keeper to the Rooks and Jackdaws in the rookery of Oxley Bank, Bretton Park, near Wakefield, Yorks., where the birds had the habit of collecting rubber. Some of the rubber may have been ejected in pellet form, but that which attracted my attention was festooning the bushes. It was mostly red in colour and consisted chiefly of rubber bands or rings from hermetically sealed bottles and tins, though some was obviously scraps of toy balloons. In 1934 the major part of this rookery was felled and the undergrowth of elders, together with the scrub, was burned, when there was a pronounced smell of burning

rubber. Since then there has been no rubber collecting at this rookery, nor have I ever noted it elsewhere.

Regarding the occurrence of small red stones in castings, I can also corroborate this from the same place. This habit continues, the ground under some of the trees being distinctly coloured with red chippings. Light-coloured stone is the natural content of the soil locally, so I think that these chippings may be obtained from colliery slag heaps and refuse tips, where also at least some of the rubber may have originated.

I should add that there was never any question of any birds other than Rooks and Jackdaws using the place for roosting purposes.

JOHN C. S. ELLIS.

CIRL BUNTING SINGING IN FLIGHT.

ON October 2nd, 1948, at Lymptstone, Devon, I heard the song of a Cirle Bunting (*Emberiza cirulus*) overhead and saw three birds of this species flying in a scattered party at a height of perhaps sixty feet. One veered away from the others and twice while in sight sang at intervals of a few seconds. Although very familiar with this species I have never before heard the song uttered in full flight, but on one or two occasions have seen and heard one sing the moment before alighting on a flight from one tree to another.

R. G. ADAMS.

LAPLAND BUNTING IN STAFFORDSHIRE.

ON December 5th, 1948, we saw a Lapland Bunting (*Calcarius lapponicus*) by Cannock Reservoir, South Staffordshire. It was seen again on the 7th by A. R. Mead-Briggs and on the 8th by H. G. Alexander, and a number of other observers. The following description is taken from the notes of all observers.

Crown grey-brown blending into broad, blackish-brown bands on either side of the crown. Buffish superciliary stripe extending almost to nape, and broadening behind the eye. Upper-parts rich brown, heavily streaked very dark brown; two white lines down each side of back. Faint pale tips to wing-coverts; primaries dark brown with pale edges; secondaries rich chestnut brown. Rump light buff streaked dark brown. Tail very dark brown with slight white edging. Face grey-brown; black line from behind ear-coverts to chin; narrow black-brown streak down sides of throat; throat buffish-white. Upper breast buffish-white slightly streaked with grey; under-parts buffish-white with conspicuous dark brown streaks along flanks. Legs dark. Eye black or dark brown. Bill, upper mandible buffish brown, lower mandible rather brighter showing yellowish tinge towards cutting edges.

The bird was extremely tame and was watched, while feeding amongst grass and short heather at the edge of the reservoir, at as little as six feet in good light. The behaviour on the ground was very lark-like. In flight it resembled a Snow-Bunting (*Plectrophenax nivalis*). The note was a short unmusical twitter sometimes

followed by a louder metallic note similar to Snow-Bunting's but duller in tone and sharper.

Although on paper very few plumage facts are wrong for Reed-Bunting (*Emberiza schæniclus*), in the field the bird did not remotely resemble this species. The main differences, apart from the call notes, were the short tail, longer and flatter head, different gait and flight, heavier spotting on back and streaking on flanks.

This appears to be the first record of this species in Staffordshire.

H. LAPWORTH, M. K. HOWARTH, G. A. GRAIN,
M. J. ROGERS, A. W. WOLTON, J. R. RAWSTHORNE.

WALL-CREEPER IN JERSEY.

Miss Bronkhurst, of Basingstoke, informs me that she and a friend very clearly identified a Wall-Creeper (*Tichodroma muraria*) near St. Brelade's Bay, Jersey, on August 21st, 1948, in the afternoon after very heavy rain. The bird "glued" itself to the wall of an hotel at the height of about 6 feet and not more than 12 feet from the observers. The bill was black and thin, down-curved and pointed, and the crimson splashes on the wings and the white spots on the primaries were very clearly seen, and the bird, which was observed on the wall for about 50 seconds, occasionally uttered a short sweet song.

F. L. BLATHWAYT.

NUTHATCH "HAWKING" INSECTS

ON July 2nd, 1948, I was watching a young Nuthatch (*Sitta europæa*) on an acacia, at Sampford Arundel, Somerset, when suddenly it launched itself into the air, and caught an insect, just as a flycatcher would. The behaviour was similar to that recorded by Mr. A. V. Cornish (*antea*, p. 56).

E. M. WILLIAMS.

[We have received several records similar to the above. Mr. M. Corbould has sent three records of this flycatcher-like behaviour from Dilham, Norfolk, on August 10th and 13th, 1948, and January 18th, 1949; Mr. A. A. Wright reports an instance from Hastings on April 9th, 1949; and Mr. R. M. Garnett has drawn our attention to a previously published record in *The Naturalist* (1947, Jan.-Mar., p. 11). The habit is evidently not very unusual.—EDS.]

AUTUMN IMMIGRATION OF GREAT TIT, BLUE TIT AND COAL-TIT AT DUNGENESS, KENT.

THE purpose of this note is to follow that of Dr. J. M. Harrison (*antea*, vol. xli, p. 182) in trying to shed light on the question of the autumn immigration of tits into south-east England.

During most of September and for the first week of October, 1949, I made frequent visits to Dungeness for the purpose of watching migrants.

The first I saw of tits in that area was on September 20th, when I identified a Blue Tit (*Parus cæruleus*) and a Continental Coal-Tit (*Parus a. ater*) among the willows there.

On September 22nd I and three reliable observers watched two Continental Coal-Tits, noting at very close quarters the clear blue or slate-grey of the back, mantle and scapulars.

A week later no tits were to be seen but on September 30th, at Littlestone, there were two Continental Coal-Tits with one of the British subspecies (*P. a. britannicus*) and about a dozen Great Tits (*Parus major*) and Blue Tits in equal numbers.

On October 3rd there were four Great Tits at Dungeness and on October 4th I saw two Continental Coal-Tits on the shingle at the point and three Blue Tits at the lighthouse.

Among the willows on the following day were one Great Tit and four Blue Tits.

On October 6th, the last day of my observations, I actually saw a Blue Tit fly in from the east and alight on the foreshore, whence it advanced slowly towards more suitable surroundings.

The winds throughout the period of observation were easterly and usually moderate.

Although these notes are fragmentary and do not cover the whole period of possible immigration they do indicate that tits of Continental origin arrive in considerable numbers in this area in the autumn.

M. L. R. ROMER.

DISPLAY BEHAVIOUR OF WAXWINGS.

AMONG a small flock of four or five Waxwings (*Bombycilla garrulus*) present in an elm copse near Sandwich, Kent, on February 20th, 1949, two birds were noted passing an object which might have been a large seed, from bill to bill. The birds would sit side by side, and one would pass the seed to the other, by turning its head and inclining its body forward so that it was brought face to face with its companion. Sometimes the birds were perched face to face on adjacent branches, when passing was facilitated by each bird leaning forward and inclining its head to one side. The first position described gave the gesture an air of extravagant courtesousness.

While the birds were under observation the seed was exchanged six or seven times. Sometimes it was immediately offered back to the other bird, and sometimes it was retained for a measurable time. The presence of a third bird of the same species was resented and twice it was driven away.

The seed appeared to be something rather less in size than a haw. Later seeds which appeared very like the one used in the display were found under the elms in the copse, and I am indebted to Mr. L. Wilson for identifying these for me as hawthorn seeds.

Owing to the birds moving away while the display was in progress the final destination of the seed, whether eaten or dropped, was not noted.

VICTOR C. W. LEWIS.

[Although this form of courtship behaviour in which a berry or seed is passed to and fro is evidently regular, few accounts of it are available (*cf. antea*, Vol. xli, p. 8 and *Handbook of British Birds*,

Vol. v, p. 264). It may be surmised that it is habitual on the breeding ground and occasional in winter quarters.—EDS.]

REDWING FEEDING ON IVY-BERRIES.

I FIND that *The Handbook* does not include ivy-berries in the food of the Redwing (*Turdus musicus*). It may therefore be worth recording that on March 21st, 1949, at Lymptone, Devon, I watched a party of four Redwings eating ivy-berries. The trees and bushes in which the party was seen are visited annually by Redwings, so ivy-berries may well be a common article of their diet. One of the four was seen to eject an ivy-seed, a habit shared by, at any rate, the Song-Thrush (*Turdus ericetorum*) and the Blackbird (*Turdus merula*).

R. G. ADAMS.

BLACKBIRD APPROPRIATING SONG-THRUSH'S NEST.

ON March 27th, 1949, at Stanway, near Colchester, the nest of a Song-Thrush (*Turdus ericetorum*) was found in a bramble bush, and it then contained one egg. On April 2nd, when next examined, there were three Song-Thrush's eggs and also three eggs of the Blackbird (*Turdus merula*). On the following day the Blackbird was seen sitting on the nest, and eventually all six eggs hatched out, the Song-Thrush not being seen again at the nest. On April 20th there were only two young Song-Thrushes; the second disappeared on April 21st, and on April 23rd the third and last was found dead beneath the nest, which was occupied by the three young Blackbirds until they flew on April 28th.

The nest is in a private garden, and there is no likelihood of the eggs having been substituted by human agency.

G. H. R. PYE-SMITH.

SUB-SONG OF FEMALE BLACKBIRD.

ON September 24th, 1948, I was in a garden near Aberdeen. Hearing a sub-song, I looked into a shrubbery and saw a female Blackbird (*Turdus merula*) turning over dead leaves on the ground. It was only when the soft warbling broke out afresh from the direction in which she moved that I connected this new sub-song with the Blackbird. I altered my position and was able to watch her singing on the ground for several minutes from a distance of six feet. The bill was not appreciably opened but slight movement of the throat feathers, tail, and wings coincided with accented phrases of the sub-song.

She continued to rummage casually among the leaves, but after each search would stand still and warble for as much as two minutes—a soft, indeterminate flow of melody, with none of the male's characteristic pauses, but with the rich Blackbird notes sounding most clearly. At one moment she stood alert and replied to the protest note of a male that was feeding close by. On September 25th, in the same place, I again saw what I took to be the

same bird, singing from the branch of a fir tree about eight feet from the ground. Once more I was able to approach within a few feet and listen for over ten minutes. On this occasion I had with me an independent witness, and in the meantime we had been careful to check the plumage differences between the immature male and adult female in *The Handbook*. Having thus seen the bird in a reasonably good light from a short distance, both from above and below, I had no hesitation in identifying the singer as a female Blackbird.

A. W. P. ROBERTSON.

ROOSTING HABITS OF DIPPER.

THE Handbook of British Birds does not give any information on the roosting of the Dipper (*Cinclus gularis*), so I have collected the following notes from my own observations made during 1947 and 1948. The observations were made in the Porter Valley (outskirts of Sheffield) and in Lathkill Dale (Derbyshire).

In the former area I found a Dipper roosting on at least two occasions in a space in the stonework on the underside of a bridge over the Porter brook. In the latter area I made a few observations which I now summarize.

In every case the roost was under one or the other of two waterfalls—in all but one case, behind the falling water. In this exceptional case, the roost was behind a curtain of a small amount of wet aquatic vegetation that was hanging on to the falls. The waterfalls are man-made and vertical or nearly so, and the roosts are in hollows in the stonework. All the roosts that I have found in Lathkill Dale have been above deep, calm water (perhaps this is because the only waterfalls of this kind in Lathkill Dale are above such deep water).

The arrival of the Dipper at the roost seems to be fairly stereotyped. The bird remains on the bank (alone) and then, after an occasional bathe, feed or preen, makes its way in two or three steps to a position (say on a stone) near the roost. Then the bird walks and flies into the roost. Often there is a false arrival at the roost, and the bird then flies out and in a few moments goes back inside. It seems from my observations that Dippers roost in the same place (or at least, behind the same waterfall) each night. Here is the evidence for this statement.

- (a) Porter Valley—On at least two occasions a Dipper was disturbed from roosting in one place under one particular bridge.
- (b) Lathkill Dale—Five observations show that two waterfalls are Dipper roosts. One of these was examined on two occasions and the other on three. On each occasion a roosting bird was found, and although the observations were not on consecutive evenings they seem to show that individual birds occupy one particular roost and presumably do so regularly.

The Dipper usually goes to roost later than the Blue Tit (*Parus caeruleus*) and earlier than the Robin (*Erithacus rubecula*).

JOHN F. BARKER.

BEE-EATER IN SUSSEX.

ON April 30th, 1949, I was on the sands at Selsey, Sussex, close to the sea. The wind was from N.E. At 10.40 a.m., a strange bird, to me, came over the sea from S. It was calling "turruk, turruk." I could not guess what it was until it was right over me; then the characteristic two prolonged, pointed inner tail-feathers of the Bee-eater (*Merops apiaster*) could be seen. As it flew to a tree in a garden its golden-bronze upper-surface became conspicuous. It rested there for a time and then kept on going after some flying insects. These turned out to be St. Mark's Fly, which the Starlings (*Sturnus vulgaris*) were dealing with. It once got nearly a quarter of a mile away. At 11.45 a.m. it started its way back to France, on exactly the same route as it came. NORMAN H. JOY.

"ANTING" OF GREEN WOODPECKER.

ON September 18th, 1949, I was watching a cock Green Woodpecker (*Picus viridis*) feeding on ants on my garden path at Studham, Bedfordshire. Its hopping progress stopped, and, standing in a huddled position, it began pecking repeatedly at the ground and rummaging in its breast feathers with its bill. After a pause, the process was repeated, this time the ants being stuffed beneath each wing. It then continued feeding.

KENNETH ALLSOP.

[For another record see *antea*, p. 59.—EDS.].

UNRECORDED CHARACTERISTICS OF NESTLING GREAT SPOTTED WOODPECKER.

IN 1949 I have had the opportunity of observing and handling young Great Spotted Woodpeckers (*Dryobates major*) in a nesting-box and was able to note that they had a pad, roughened by papillae, at the back of the tarsal joint and a prominent, hard, rounded knob on each side of the lower mandible near its base, exactly as described in *The Handbook* for the nestling Green Woodpecker (*Picus viridis*) but not for that of the Great Spotted Woodpecker. The rough papillae almost disappear in the last few days before fledging so that it is practically impossible to feel them on a fully grown nestling; the knob likewise gradually disappears so that four days before the young are ready to fly it has almost entirely gone and when they do fly there is no trace of it left. In the middle stages it occupies nearly all the space between the lower front corner of the eye and the base of the lower mandible.

EDWIN COHEN.

AUTUMN AERIAL ACTIVITY OF KESTRELS.

DURING the afternoon of September 21st, 1948, an exceptionally calm and sunny day, I was watching a Kestrel (*Falco tinnunculus*) hunting over broken hillside country south of Burnley, Lancs. This bird was shortly joined by another, and together they sailed higher and higher in spirals, until they had attained a very considerable height. Then both glided westwards for a quarter of a mile or thereabouts, before parting without further display. I

lost sight of one, but through binoculars (x8) watched the other veer and head southwards for about half-a-mile, gliding steadily all the way. Both birds maintained silence throughout the whole performance.

I was within half-a-mile of the same area on October 19th, and again in mid-afternoon saw two Kestrels come together and just circle a little before going their separate ways.

The behaviour would seem to contain certain features common to both Labitte's account of spring aerial display and R. H. Brown's description of an unusual autumn flight (*Handbook*, Vol. iii, pp. 26-7), though nothing exactly similar appears to have been recorded.

K. G. SPENCER.

KITES IN ESSEX.

ON April 25th, 1949, on a farm at Ardleigh, near Colchester, Essex, my attention was drawn by two birds circling some distance above me, obviously showing aggressive behaviour.

On further scrutiny I observed the smaller of the two, which was calling, to be a Rook (*Corvus frugilegus*) and the larger to be a hawk with tail strongly forked, and narrow wings with light patches towards the tips. This bird, which had all the time been soaring effortlessly in circles, suddenly broke away and made off towards the west in a series of glides punctuated by slow, lazy wing beats.

Unfortunately I was without the aid of binoculars at the time but, from the points which I have noted above, I came to the conclusion that the bird was a Kite (*Milvus milvus*).

A short while ago Messrs. Austin and Wright (*antea*, p. 60) made a similar observation at Epping Forest, Essex. JOHN N. MEAD.

ON April 23rd, 1949, at about 4.45 p.m., I was watching warblers in a bush at Baldwin's Hill, Epping Forest, Essex. Happening to glance up I caught sight of two large birds approaching over the tree-tops at a moderate height. One of them almost immediately veered off to the right and was lost to view behind trees; the other came straight on over the small clearing where I was, and I recognized it as a large bird-of-prey. As it passed overhead I observed its long, blunt-ended and noticeably angled wings, which immediately suggested to me its identity. It flew with steady, measured strokes and I succeeded in getting my glasses on it before it was lost to view behind trees. Glasses revealed that the tail had a decided fork, and I knew the bird to be a Kite (*Milvus milvus*). As the bird was directly overhead and the sunshine bright, I was unable to see any plumage details. The direction of flight was from E.S.E. to W.N.W. I cannot be certain of the identity of the other bird, but I have the impression that it was accompanying the first and was of the same species.

I might add that I am very familiar with the "Pariah" Kite (*Milvus migrans govinda*) in India and with Common Buzzards (*Buteo buteo*), which I have observed on a number of occasions in Germany and elsewhere.

A. V. TUCKER.

GREAT WHITE HERON IN CORNWALL.

FROM September 28th until about October 20th, 1948, a Great White Heron (*Egretta alba*) was present at Loe Pool, Penrose, Helston, Cornwall. It was first seen by an estate resident on September 28th and I identified it on the following evening. On the evening of September 30th it was watched by Dr. R. H. and Mr. J. Blair, who confirmed the identification.

The silhouette, gait, flight and feeding methods resembled those of the Common Heron (*Ardea cinerea*), but the gait was more deliberate. The longer legs, more slender body and longer, thinner neck made it dwarf the Common Herons present. The plumage was a very pure white, the bill deep yellow and the legs black. No note was heard. It roosted in a fir tree where it was a conspicuous object long after dark.

In view of its indifference to man, especially during the first few days of its stay, I suspect that it might have escaped from captivity, but no escape has been traced.

A. G. PARSONS.

BITTERN BREEDING IN LINCOLNSHIRE.

EARLY in the nineteenth century the Lincolnshire marshes were drained, and, according to the late J. Cordeaux, the Bittern (*Botaurus stellaris*) ceased to breed about 1825 (Blathwayt's 1914 List). Since that time it has been merely an occasional winter-visitor.

Of recent years Bitterns have been increasingly frequent in the north of the county, and when a report of "booming" reached the writer early in 1949, it was felt that the matter was worthy of further investigation. Enquiries elicited the information that it was in 1941 or 1942 that the Bittern was first noticed in the north of the county, but the "booming" was not associated with the species, and was attributed by some local people to the Mute Swan, (*Cygnus olor*), by others to the Otter, which is numerous in the same locality.

"Booming" is not necessarily proof of nesting, and, although a local man claimed to have found a nest in 1948, he was not an ornithologist, and no proof was available.

"Booming" recommenced late in March, 1949, and on April 17th three Bitterns were flushed from dense reed-beds, and two others, which may have been additional, were seen on the wing at sunset. The "booming" was heard at intervals throughout the day.

Then, on April 24th, breeding in Lincolnshire was confirmed beyond all doubt by the discovery in a dense reed-bed of a nest and four eggs. The flattish platform of dead reed-stems was about the size of a Coot's nest, and rather smaller than had been expected. The Bittern left when the nest was approached, and the eggs were clean and apparently not far incubated.

It would not be easy to assess the resident population, but the surrounding terrain is ideal, one such tract alone covering thirty-seven acres, and there is suitable cover for several pairs.



NORTHERN GOLDEN PLOVER (*Pluvialis apricaria altifrons*). MALE WITH
NEWLY HATCHED CHICK, SWEDISH LAPLAND, JULY 2ND, 1931.
(Photographed by Olof Swanberg).



NORTHERN GOLDEN PLOVER (*Pluvialis apricaria allifrons*). MALE, SWEDISH LAPLAND, JULY 2ND, 1931.
(Photographed by Olof Swanberg).



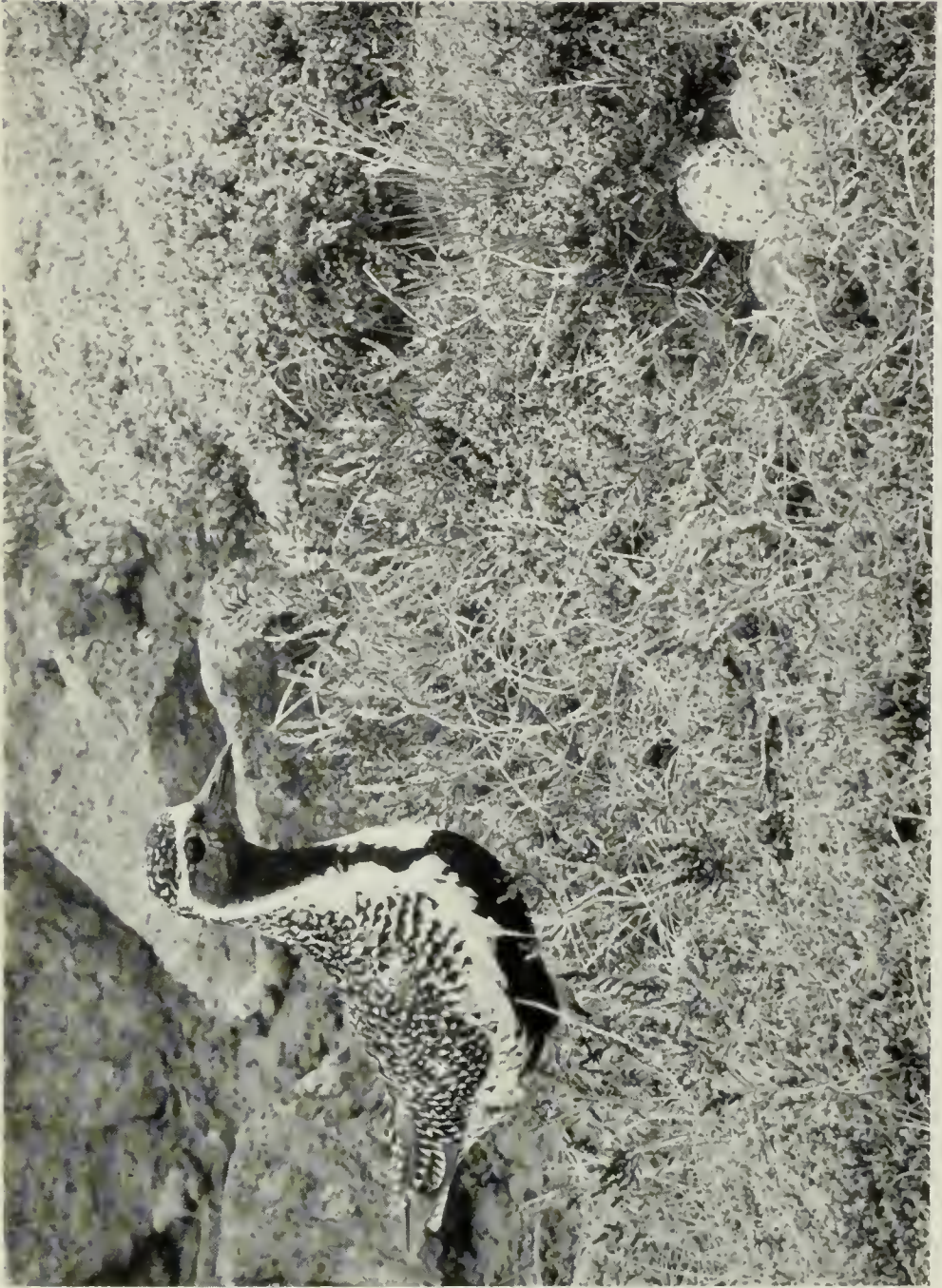
NORTHERN GOLDEN PLOVER (*Pluvialis apricaria altifrons*). FEMALE, SWEDISH LAPLAND, JULY 2ND, 1931.
(Photographed by Olof Swanberg).



NORTHERN GOLDEN PLOVER (*Pluvialis apricaria altifrons*).
MALE, SWEDISH LAPLAND, JULY 2ND, 1931.
(Photographed by Olof Swanberg).



NORTHERN GOLDEN PLOVER (*Pluvialis apricaria allifrons*).
MALE APPROACHING NEST, NORTH ICELAND, JUNE, 1948.
(Photographed by G. K. Yeates).



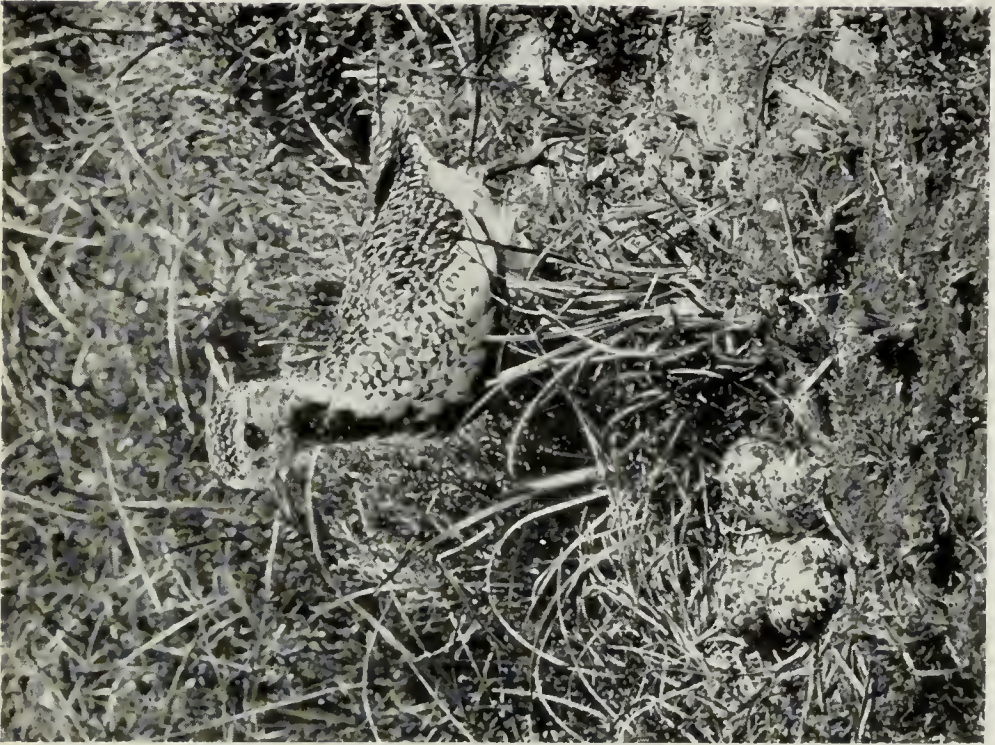
NORTHERN GOLDEN PLOVER (*Pluvialis aprinaria allifrons*).

MALE APPROACHING NEST, S. W. ICELAND, JUNE, 1949.

(Photographed by G. K. Yeates).



SOUTHERN GOLDEN PLOVER (*Pluvialis a. apricaria*).
MALE APPROACHING NEST, INVERNESS-SHIRE.
(Photographed by Eric Hosking).



SOUTHERN GOLDEN PLOVER (*Pluvialis a. apricaria*).
MALE APPROACHING NEST, ORKNEY.
(Photographed by Eric Hosking).



SOUTHERN GOLDEN PLOVER (*Pluvialis a. apricaria*).
FEMALE APPROACHING NEST, YORKSHIRE.
(Photographed by Eric Hosking).



UPPER.—NORTHERN GOLDEN PLOVER (*Pluvialis apricaria altifrons*).
FEMALE PAIRED WITH MALE SHOWN IN PLATE 78.

(Photographed by Dr. K. J. V. Carlson).

LOWER.—MALE GOLDEN PLOVER OF NORTHERN TYPE.
PHOTOGRAPHED NEAR NEST IN BRECONSHIRE, MAY 17TH, 1937.

(Photographed by H. Morrey Salmon).



NORTHERN GOLDEN PLOVERS BREEDING ON ST. KILDA, 1948.
(*Photographed by Frank Darling.*)



NORTHERN GOLDEN PLOVERS BREEDING ON ST. KILDA, 1948.
(*Photographed by Frank Darling.*)



GOLDEN PLOVER (*Pluvialis apricaria*). JUVENILE ON SHORE, WEST COAST OF SWEDEN, SEPT. 13TH, 1941
(Photographed by Olof Swanberg).

It may be of interest also to report that within twenty yards of the Bittern's nest was the nest of a Water-Rail (*Rallus aquaticus*) with seven eggs. Information regarding the breeding of the Water-Rail in the county is very scanty, and there appear to have been no previous claims in the present century.

Messrs. C.H. Colebrook, J. Kennington and R. C. May, all members of the L.N.U., will corroborate the discovery of the above nests, and the Union is indebted especially to Mr. Else for drawing the writer's notice to the presence of the Bittern. S. A. Cox.

GREEN-WINGED TEAL IN DORSET.

THE Revd. H. R. A. Cornish, Vicar of Portesham, has informed me that he saw a drake Green-winged Teal (*Anas crecca carolinensis*) on the Radipole Lake, Weymouth, on November 30th, 1948. There were over 600 Teal on the water, some scattered in little groups, and he had the good fortune to get his glasses on to this bird in bright sunshine at a distance of about 50 yards, and had it under observation for a quarter of an hour. He noticed especially that the dark green broad stripe on the head lacked the cream surround, and that there was no cream streak above the wing but a shorter vertical streak in front of it. Identification is therefore sure, and the only question is, was the bird an escape? I wrote to Peter Scott who kindly checked his waterfowl registry covering 80 collections and replied "there is not a one per cent. chance that this bird could be an escape." The bird I presume had been "picked up" by some flock of Common Teal (*Anas c. crecca*), migrating from the North.

F. L. BLATHWAYT.

TUFTED DUCK PERCHING.

ON January 11th, 1948, at Gailey Pools, Staffordshire, we observed a drake Tufted Duck (*Aythya fuligula*) perching. It was on a horizontal dead branch about a foot above the surface of the water. The branch itself was approximately two inches in diameter.

This behaviour appears to be unrecorded in *The Handbook*.

A. W. WOLTON, J. R. RAWSTHORNE, M. J. ROGERS

"BLUE" FULMAR ON LAMBAY ISLAND.

A "blue" Fulmar Petrel (*Fulmarus glacialis*) was seen by a party from the Bird Group of the Dublin Naturalists' Field Club on the cliffs above the Seal Hole on Lambay Island, Co. Dublin, on June 13th, 1948. There were between 20 and 30 'normal' Fulmars on the same cliff so that comparison was easy. The "blue" bird left the cliff twice and when it flew past its belly and underparts were clearly visible. Its head, neck, breast and belly were a uniform pale blue-grey strikingly different from the white of the other birds present.

A. G. MASON.

COLOUR OF SOFT PARTS OF STOCK-DOVE.

THE Handbook states of the Stock-Dove (*Columba ænas*) "skin round eyes pink." In eleven captive birds kept for periods of

upwards of a year at different times, I have always found the skin of the eye-cere to be a bluish-grey, almost the same tint as the feathers surrounding it, and hence not at all noticeable unless the bird is examined closely. Owing to this, one is not normally conscious of any skin about the eyes when observing a wild Stock-Dove, even at fairly close range, when, if the skin were pink, it would undoubtedly show up clearly. The birds at present in captivity at the London Zoo show this point clearly and the grey eye-rims are also very well shown in the illustration in Vol. VII of Sharpe and Dresser's *Birds of Europe*. In view of the fact that in feral Pigeons (*Columba livia*) in which the eye-cere is usually a powdery white, some birds—usually “plummy” blue-chequers—have this area pinkish it is very likely that an analagous variation may not be uncommon in Stock-Doves and information from different parts of the country would seem desirable.

With one exception I have found that my female Stock-Doves always had the feet and legs duller and less pink in colour than the males and the bill-colouring less “clean” and commonly retaining a dusky tinge near the tip. I suspect, however, that there is much variation in this matter. The exception above referred to had the brightest red feet of any Stock-Dove I have owned, and a mated pair of wild birds seen at close range through 9×35 binoculars, appeared identical in bill and leg colour. DEREK GOODWIN.

NESTING OF THE FÆROE SNIPE.

BREEDING of the Færoe Snipe (*Capella gallinago faeroeensis*) in the Færoe Islands is spread over the whole season, but May and June are the months in which nests are most commonly found. I ringed a week-old chick at the end of May, 1943, and found my last newly-hatched chicks on August 3rd and 9th in the same year. It is probable that some birds are double-brooded.

Clutch-size. 1943— $7 \times c/4$, $2 \times c/3$, $1 \times c/2$; 1944— $6 \times c/4$, $2 \times c/3$; 1945— $2 \times c/4$. Total, $15 \times c/4$, $4 \times c/3$, $1 \times c/2$.

I have two records of full broods hatching on the 18th day after the laying of the last egg: it is thought that incubation began with the third egg. In another case the brood completed hatching on the 19th day after the laying of the last egg, and in this nest sitting began with the third. The hatching-period at this nest, from the chipping of the first egg (with the young audible in the others) to the emergence of the last three young, was 45 hours. Normally the duration of hatching is much shorter, once only 22 hours from the first activity of the young inside unchipped shells.

In all the nests some broken shells and lining-tissues remained after the young had gone, and it would appear that the shell remains of early hatchings only are removed. In some cases only the shell-linings remained.

It is usual, but not invariable, for a sitting Snipe to rise silently from eggs or young. Impeded flight is a frequent reaction to

disturbance, especially if the bird is surprised. The Færoe Snipe often gives an elaborate and very beautiful lure display when flushed from eggs or small young, a full description and discussion of which will appear in a future number of *The Ibis*.

Nests are usually in long tussocky grass or short heather, and as often on dry and rather stony areas on the hills as among the wetter peat-workings of the valley floor, or the meadow-grass of the cultivated infield. On June 26th, 1943, I found an occupied nest on a coastal headland with four well-marked nesting depressions of former seasons quite close to it; another occupied nest, midway between two older nesting-cups and 18 ins. from each, was found a few hundred yards away.

Comdr. A. J. MacDermott has informed me (*in litt.*) that the Færoe Snipe is said to nest in the long grass of the sod roofs of the older houses at Mikladalur, on the island of Kallsoy; and I have heard on very reliable authority that in most years a pair nests on a similar roof in the village of Skúvoy, on the island of that name. This curious habit has managed to survive on Skúvoy, no doubt, only because there are neither rats nor cats on the island. Dr. S. Hansen, my first but not my only informant, was at one time the medical practitioner for Sandoy and Skúvoy, and he told me that on one of his visits he stood by whilst a villager replaced a Snipe chick which had fallen from the roof almost at their feet! After the breeding season it is a usual thing for several Snipe to roost together on this and other sod-roofs in the village.

KENNETH WILLIAMSON.

AMERICAN PECTORAL SANDPIPER IN ESSEX.

ON September 18th, 1949, while at Abberton Reservoir, Essex, we saw a small wader, which we could not identify. In size, it was a little larger than a Dunlin (*Calidris alpina*), more upright in posture, and not so squat and compact. The beak was slightly decurved, dark blackish grey, lighter in colour at the base. The legs were pale yellow in colour. The fore-neck and breast were ashy grey, very finely streaked with a darker colour. The belly, sharply divided from this gorget, was off-white. A lighter coloured stripe ran over each eye, the crown of the head being of a much darker brown colour. The back and wings were slightly lighter brown than the crown, each feather seeming to be margined with yellow-gold, giving the bird a noticeable golden colour. The general colour scheme was very reminiscent of a Reeve (*Philomachus pugnax*), but it seemed to be too small. The bird was very tame, and allowed us to approach within about 15 yards, when excellent views could be obtained with $\times 6$ field-glasses. When flushed, it flew for a short distance, calling twice in quick succession, the note being a short trilled whistle. The centre of the back and (I think) tail showed as dark brown, with a whitish patch on either side, rather similar to a Dunlin.

On consulting *The Handbook*, we both considered the bird to resemble an American Pectoral Sandpiper (*Calidris melanotos*).

Turning up the pictures of an example of this bird in *British Birds, antea*, p. 144 *et seq.*, our opinions were quite confirmed, our bird resembling almost exactly that shown on plates 23 and 24, except that its breast did not seem quite so strongly streaked.

This is the first record for this species for the county of Essex.

A. MARSHALL AND O. THOMPSON SMITH.

WOOD-SANDPIPER IN CORNWALL.

THE arrival of two Wood-Sandpipers (*Tringa glareola*) at the Tamar Lake (border of Devon and Cornwall) on August 20th, 1949, was the first record I have of this species in N. Cornwall.

The water level of the lake being abnormally low the many waders present had ample feeding-grounds; this probably accounted for the long stay of over a month of the Wood-Sandpipers.

During this time I had many opportunities of watching them at very close range. Consorting with both the Green Sandpiper (*Tringa ochropus*) and the Common Sandpiper (*Actitis hypoleucos*) a useful comparison in size and colouration was afforded.

Compared to the Green, the more slender and long-legged Wood-Sandpiper had brownish upper-parts freely speckled with white and in flight the dark under-wing of the Green contrasted with the pale grey of the Wood, whose white rump was also less conspicuous—though very clear—than that of its companion.

The most cautious approach often sent the nervous Green Sandpiper towering up over the lake while the much less wary—even confiding—Wood remained. When, however, it rose in flight, it frequently towered almost as much as the Green. Rarely was the up and down movement of the hinder part observed except when either agitated or alarmed. Very sedate in all its movements, it seldom if ever broke into a run.

The legs generally appeared greenish, but when the bird stood in shallow water in full sunlight they were definitely yellow. The Wood-Sandpiper often rested and dozed in this manner after feeding—standing on one leg in the water.

The notes when flushed were usually “chip-chip-chip-chip,” sometimes a triple note and occasionally from the feeding-ground I heard a more musical double note something like “tchu-wee” and “tchu-u.”

FLORENCE CARTER.

FIRST RECORD OF LITTLE RINGED PLOVERS IN SUFFOLK

IN my account (*antea*, Vol. xli, p. 382) of the status of the Little Ringed Plover (*Charadrius dubius*) in Southern England in 1948 it was stated that the first record of the species for Suffolk was on May 11th, 1948. Since the account was written, Mr. L. R. Flack has recorded (*Report of the Cambridge Bird Club* 1947, p. 32) the presence of two pairs near Lakenheath in the summer of 1947. Mr. Flack informs me that the birds were seen first in July, when they were occupying similar sites in close proximity, sandy hills left from the floods, with pools near by. It was suspected that both

pairs were breeding, but no proof was obtained. Ringed Plovers (*Charadrius hiaticula*) were nesting in the same locality.

No Little Ringed Plovers were seen at this site in 1948, but Mr. Flack saw one on a sandy strip at the edge of the Little Ouse on April 18th and three on May 2nd, but none subsequently.

E. R. PARRINDER.

NORTHERN GOLDEN PLOVER IN STAFFORDSHIRE AND NOTES ON THE SEASONAL DISTRIBUTION OF THE SPECIES ON THE NORTH STAFFORDSHIRE MOORS.

THE Northern Golden Plover has not previously been recorded in Staffordshire although its occurrence on passage is probably regular. This appears to have been assumed by T. Smith in *Birds of Staffordshire*, part V, published as an appendix to *Trans. N. Staffs. Field Club*, 33-34, where the name of the northern form (*Pluvialis apricarius altifrons*) is given in brackets with that of the southern form (*Ch. a. apricarius*), although no actual records of the first-named are given. On the evening of April 24th, 1947, I saw a flock of 100 Golden Plovers (count made) on a field of rough grass east of the Royal Cottage Inn at the head of the Churnett Valley. Of these birds about 90 were of the northern form in full breeding plumage, the rest being of the southern form (also in breeding plumage), while a few were still in winter plumage. After I had left the immediate area two flocks, each of approximately 20 Golden Plovers, were seen making for the same field and these were presumably an addition to those which had already been counted. On the morning of the 25th, my wife and I again found about 100 birds of both forms present as above, but in the evening the number had fallen to 30. Clearly the field was being used by birds of the northern form crossing, or perhaps following, these hills which form the southernmost spur of the Pennine chain. Birds of the local breeding population were already thinly distributed in pairs or singly in various parts of the district at the same period. One of the Southern Golden Plovers present on the field mentioned above was in fact making a scrape in the grass while sexual activity among the migrants of the northern form was confined to chases on the ground and snatches of song when on the wing.

This particular spot appears to be a regular resting place for migrating Golden Plover probably predominantly of the northern form, for on September 29th, 1944, 83 birds in a compact flock were counted on it. This was by far the largest flock I have seen in this district during a ten-year period of 2-3 annual visits covering all seasons. The keeper of the estate concerned has also found flocks of this species most regularly on this particular field over which a special drive for Golden Plover is in fact held annually.

As the *Handbook* (Vol. iv, p. 367) gives the impression that breeding grounds of this species are entirely deserted after late August, it is of interest that in N. Staffs Golden Plovers can be found on the high moors at all times of the year, at least in the particular area referred

to above (see B. R. S. Pemberton, cited in T. S. Smith quoted above). The keeper similarly records the local occurrence of this species in winter, while I have seen Golden Plovers on these hills as early as February 6th (1943).

E. O. HÖHN.

TUMBLING FLIGHT OF AVOCET.

IN view of a recent note on this topic (*antea*, p. 95), the following observations may be of interest.

On February 18th, 1949, three Avocets (*Recurvirostra avosetta*), wintering on the Tamar Estuary in South Devon, were under observation. The Avocets, feeding at the tide edge, took flight and flew down the estuary at high speed in a most erratic manner, repeatedly tumbling to water level and then shooting up to thirty or forty feet, side-slipping and twisting all the time. The performance was distinctly reminiscent of the erratic flight of Bar-tailed Godwits (*Limosa lapponica*), although the eccentricities were on a larger scale. At the time of these observations, a very strong south-westerly wind was blowing up the estuary.

Although the Avocets were watched on various other occasions in February and March, no other similar performance was seen.

DAVID M. GRIFFIN.

COMMON GULLS IN THE NORTH SEA.

ALTHOUGH the Common Gull (*Larus canus*) presumably migrates across the North Sea from Scandinavia in the autumn, there are very few records of this species being seen at sea or in fact more than a mile or two from the coast.

On August 28th, 1948, at 07.00 hrs. in 57°N., 1½°E, 8 immature Common Gulls appeared and followed the ship in its south-westerly course for about 5 hours. They showed no particular interest in the ship, flying 50 ft. above it, not over the wake. When first seen they were 80 miles east of the Aberdeenshire coast and 140 miles west of the southern tip of Norway.

ERIC DUFFEY.

SCANDINAVIAN HERRING-GULL IN YORKSHIRE.

I RECENTLY received for examination, from Mr. K. Brown of Leeds a wing of a Herring-Gull (*Larus argentatus*) which he had severed from what he believed to be an unusually dark specimen at Eccup Reservoir, nr. Leeds, on November 21st, 1948. Mr. Brown, in fact, tentatively assigned the bird (which had flesh-coloured tarsi and feet) to *Larus argentatus omissus* Pleske, and a comparative examination of the wing at the Yorkshire Museum has fully confirmed his identification.

The blue-grey of the coverts is noticeably darker than in twenty-two examples of the typical race and is matched more or less exactly by the characteristically darker blue-grey coverts in five specimens of *Larus argentatus omissus*. The wing also agrees with the latter in having the grey on the inner webs of the primaries not only darker and more pronounced, but also more extensive in so

far that it runs up closer to the mirrors than in the majority of specimens of *Larus argentatus* examined. This is the second recorded example of the Scandinavian Herring-Gull in Yorkshire.

Although the foregoing remarks are based on the examination of comparatively fresh material it seems worth stating, especially in view of recent observations on colour changes in bird skins, that during the comparisons made in the present enquiry, the two British-taken specimens of *Larus argentatus omissus* in the British Museum from Hayling Is., December 27th, 1895, and "Leadenhall market", November 12th, 1879, respectively, were examined and compared with the more recent material. The wing-coverts of both these specimens, whilst they have retained depth of tone, have lost almost entirely the blue-grey, which has been replaced by brownish-grey. Thus, today, the racial evaluation of these admittedly old skins is by no means an easy matter. If, for instance, they are placed alongside a series of normal examples, it involves the interpretation of two distinct shades of grey in terms of tonal rather than colour values. Alternatively, if assessment is attempted with material of similar age additional difficulties arise owing to perplexing and vexatious post-mortem divergences which are sometimes apparent in gulls taken and prepared at the same time.

REGINALD WAGSTAFFE.

LITTLE CRAKE IN CARDIGANSHIRE.

ON January 1st, 1949, I saw what I am certain was a Little Crake (*Porzana parva*) on the coast of Cardiganshire mid-way between New Quay and Aberayron. At the side of a swampy patch a small brown bird hopped into the air almost at my feet. Apparently it had been feeding in the flooded ditch. It flew a few yards in rather weakly fashion and got down among some blackthorn scrub where I lost it.

At a first glimpse my impression was that it was an undersized Water-Rail (*Rallus aquaticus*), but it was too small for that and as it turned its head I saw the short bill with its red-spotted base. There were some smoky white markings (rather indistinct) on the mantle but none on the wing-coverts. On this last point I am absolutely certain as the bird rose vertically for two or three feet directly in front of me. It was quite silent.

I should say that I have passed this precise spot many times in recent years without seeing or hearing anything unusual. Perhaps it is worth recording that New Year's Day was exceptionally stormy and that a full gale had been blowing overnight.

W. KENNETH RICHMOND.

THE BLACK GROUSE IN HEREFORDSHIRE

THE earliest records of Black Grouse (*Lyrurus tetrix*) in Herefordshire are reported by Dr. Bull at Stoke Edith in 1840; and in 1850 at Hampton Court (Morris, *British Birds*, vol. III). Both these

places are in the central portion of the county in country very unsuitable for the species.

In the *Zoologist*, 1886, p. 250, the late Mr. H. W. Wood recorded the discovery that Blackgame had "lately" settled down at Craswall. Dr. Bull in his *Birds of Herefordshire* (1888) recorded not only the breeding of Blackgame at Craswall, but also its existence at Shobdon and Bircher Common in the north-western part of the county near the Radnorshire border. In spite of exhaustive enquiries I have never been able to trace any record of the bird in the latter area and it must have been extinct in that district for many years.

The Craswall district in south-west Herefordshire is sparsely populated and almost roadless. It is hilly with slopes covered with bracken and ancient hawthorn trees. For many years after Mr. Wood's record Blackgame existed here in some numbers. The area was shot over by the late Major T. P. P. Powell and his brother, the Rev. G. H. Powell of Dorstone. Major Powell's gamebooks record Blackgame regularly between 1894 and 1915 on Cefn Hill and Cusop Hill. Greyhens were never shot during that period—but in spite of this, the species decreased until only a single greyhen could be seen. It was this greyhen which produced the hybrid \times pheasant which was shot on Cusop Hill by the late Captain T. G. Vaughan Phillips in October, 1928, and recorded in *British Birds* and *B.O.C. Bulletin*. The Revd. G. H. Powell has a stuffed Blackcock in his possession which was shot about 1905 on Mynydd Brydd in the parish of Dorstone. In 1938 when Dr. C. W. Walker and I wrote a "List of Herefordshire Birds" (*Woolhope Club Transactions*, 1941) we described the bird as "Resident and breeding but almost extinct." This was on the strength of a report from a forester that he had seen a pair in the Craswall area in 1938. Since that date, however, no record of Blackgame in Herefordshire can be obtained and it is feared that the species is now extinct in the county.

H. A. GILBERT.

OSPREY IN HAMPSHIRE.—Mr. R. E. Williams sends details of an Osprey (*Pandion haliaetus*) seen on September 18th, 1948, at the mouth of the Hamble River, Southampton Water. It subsequently crossed Southampton Water in the direction of Fawley and later Lymington.

SPOONBILL IN SUSSEX.—Mr. Sidney J. K. Eames informs us that on August 14th, 1948, he observed a Spoonbill (*Platalea leucorodia*) feeding in runnels left by the receding tide, close to the sea-wall adjoining Birdham lock on the Chichester Channel. No yellow colouring could be seen at the base of the neck so that it was probably not fully mature.

TURTLE-DOVE IN SCOTLAND IN SUMMER.—Mr. Alan Balch informs us that he saw a Turtle-Dove (*Streptopelia turtur*) in his garden at Forres, Morayshire, on June 26th, 1948.

EXCEPTIONAL INLAND PASSAGE OF BLACK TERNS IN 1948.—The following alterations and additions should be made to the Report on the above subject (*antea*, pp. 113-117). In Table II (p. 114) the flock recorded as moving N.E. on May 21st was in S. Staffordshire, not Worcestershire.

Additional records are :

CAMBRIDGESHIRE—Peterborough Sewage Farm, over 20 on May 16th, at least 30 on May 17th, 20-30 on May 18th, about 30 on May 19th, 20th and 21st (J. W. Parker).

NORTHAMPTONSHIRE—Northampton Sewage Farm, ten on May 19th, one on June 13th (R. W. M. Lee, R. H. Baillie).

ERRATA.

- Plate 14 (facing *p.* 49). In caption, upper figure, for " *p.* 53 " read " *p.* 63 "
- p.* 94. Line 9 from bottom, for " *antea*, *p.* 249 " read " *antea*, Vol. xli, *p.* 249 ".
- p.* 96. Line 4, for " Weyburn " read " Weybourne ".
- p.* 216. Line 3 from bottom, for " Vol. xxxviii " read " Vol. xxviii ".
- p.* 256. Line 2, for " *Chlidonius* " read " *Chlidonias* ".
- p.* 319. Under Northumberland, for " H. Tueen " read " H. Tulley ".
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